FACULDADE DE CIÊNCIAS SOCIAIS E HUMANAS
UNIVERSIDADE NOVA DE LISBOA

Casa Comum da Humanidade

A "Nossa Casa Comum" como uma construção jurídica baseada na ciência

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DECLARAÇÕES

Declaro que esta Tese é o resultado da minha investigação pessoal e independente. O seu conteúdo é original e todas as fontes consultadas estão devidamente mencionadas no texto, nas notas e na bibliografia.

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Lisboa, 6 de Novembro de 2017

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Lisboa, 6 de Novembro de 2017

Tese apresentada para cumprimento dos requisitos necessários

à obtenção do grau de Doutor em ECOLOGIA HUMANA,

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À Isaura, Abel, Náná, Joana, Francisco, Sofia, Pedro e Tita.

“Os filósofos do iluminismo serviram-se de um preceito simples, mas aparentemente muito poderoso: Quanto mais capazes formos de usar a razão para entendermos o mundo e para nos entendermos a nós próprios, mas capazes seremos de moldar a história à nossa medida. Para controlarmos o futuro, é necessário que nos libertemos dos hábitos e preconceitos do passado.”

Anthony Giddens

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Resumo

As ciências demonstraram que o que está em causa não é "salvar o planeta", mas sim assegurar a manutenção de um estado favorável do Sistema Terrestre para a humanidade. Isso significa que um planeta fora desse estado favorável, não serve como nossa "Casa Comum". A realidade é que nosso planeta não é apenas uma área geográfica com 510 milhões de km2. Se todos os planetas possuem uma área geográfica, apenas a Terra possui um sistema intrinsecamente acoplado ao planeta físico, capaz de sustentar a vida tal como a conhecemos. Do ponto de vista jurídico, o planeta possui apenas uma existência como entidade territorial. Esta visão unidimensional exclui a expressão mais notável e vital da natureza - o funcionamento do Sistema da Terrestre como o "software" que suporta a vida. O Sistema Terrestre é um bem uno, global e intangível, que não encontra amparo na rigidez do atual ordenamento jurídico. O conhecimento científico já identificou os indicadores que determinam o estado deste Sistema, os chamados "Limites do Planeta", que definem as balizas que não devemos transgredir para manter o Sistema da Terrestre dentro do *Espaço de Operação Segura para a Humanidade*. Este espaço qualitativo e quantitativo de segurança é intangível e não-territorial, e constitui o nosso verdadeiro *Global Common* existente no interior e além de todas as fronteiras. Do seu não reconhecimento pelo Direito Internacional, resulta a sua invisibilidade no seio da comunidade das nações e dos povos. A sua inexistência jurídica autoriza, pois, o seu uso desregulado e a consequente *tragédia* do nosso bem comum global, reduzido à categoria de "externalidade".

Já há muito que as ciências jurídicas reconheceram a existência de bens jurídicos intangíveis como solução para a proteção de determinados interesses ou bens que se tornaram relevantes para as sociedades humanas. O património cultural imaterial da UNESCO, o direito de autor, ou o valor intangível das empresas (onde frequentemente o valor dos ativos intangíveis é incomparavelmente superior ao valor dos bens tangíveis) são alguns exemplos.

A analogia entre estes objetos de direito intangíveis e o Sistema de Terrestre, pode ser crucial não só para representar a funcionalidade global e indivisível do Sistema Terrestre

na comunidade internacional, como para dar visibilidade económica ao valor real dos serviços intangíveis realizados pelos ecossistemas na manutenção dos ciclos biogeofísicos, cujo valor é incomparavelmente superior ao valor tangível dos ecossistemas naturais que os produzem.

Uma parte significativa do desafio de "Transformar o Mundo" passa pela possibilidade de tornarmos o trabalho da biosfera visível na sociedade, nas ações humanas e nas transações económicas e financeiras. Atualmente o valor da natureza só se torna visível nas transações financeiras através da sua destruição e transformação em matérias-primas, como ocorre com a madeira das florestas.

O objetivo é propor que o estado favorável do Sistema Terrestre característico do Período do Holoceno seja reconhecido Património Comum Intangível da Humanidade. O objetivo é o de promover este novo bem jurídico global como "plataforma de coordenação", onde todas as *externalidades* positivas e negativas possam ser agregadas e contabilizadas. Este novo objeto de governança global coexistirá com os regimes legais das soberanias estaduais: um **Condomínio Planetário**. O condomínio é o único modelo jurídico existente que não se limita a uma divisão dos elementos espaciais, mas reconhece igualmente a existência de elementos não- espaciais funcionais (ex: eletricidade, água) e que por isso é capaz de assegurar uma governação *multi-level*.

Se utilizarmos diferentes de tipos de divisão jurídica (funcional e espacial) é possível a coexistência pacífica de dois regimes legais sobrepostos, mas articulados, no interior do mesmo espaço físico. Com a devida adaptação de escala a teoria que resulta desta solução poderia ter profundas implicações na organização jurídica das sociedades humanas nos dois horizontes que partilham - a Casa Comum da Humanidade: por um lado as jurisdições dos Estados (elementos territoriais) sobre o qual é possível aplicar convenções jurídicas de divisão, e por outro, de forma acoplada e sobreposta, a salvaguarda do Sistema Terrestre indivisível (elementos não-territoriais).

O reconhecimento deste bem intangível que **nos une a todos** numa escala global é uma condição estrutural para tornar visíveis os fatores vitais que suportam a vida, e iniciar um processo em que a manutenção permanente da Casa Comum não constitui um prejuízo para quem realiza benefícios comuns. Esta é uma oportunidade para transformar as pessoas e nações em sujeitos de uma humanidade concreta e realizar a transformação civilizacional da passagem de uma comunidade de exploradores do Sistema Terrestre, para uma comunidade de curadores e gestores do uso da nossa Casa Comum.

Palavras-chave: Património Comum da Humanidade, Natureza Intangível, Sistema Terrestre, Casa Comum da Humanidade, Bens Comuns Globais Intangíveis, Ecologia Humana, Direito do Ambiente, Governança Global, Limites do Planeta.

Abstract

Science has shown that what is at stake is not "saving the planet", but rather ensuring the continued favourable state of the Earth System for humanity. That means that a planet beyond the favourable state cannot serve as our "Common Home". The reality is that our planet is not only a geographical area of 510 million km^2. All planets have a geographical area, but only Earth has a living system intrinsically coupled to the physical planet, able to sustain life just as we know it. From a legal point view, the planet only has an existence as a territorial entity. This one-dimensional vision excludes the most remarkable and vital expression of nature - the functioning of the Earth System as the software which supports life. The Earth System is a single, global and intangible asset, which finds no basis in the rigidity of the current legal framework. Scientific knowledge has already identified the indicators which determine the state of this System, the so-called "Planetary Boundaries", which cannot be exceeded in order to ensure that the Earth System remains within the favourable state - *the Safe Operating Space for Humanity*. This qualitative and quantitative safe space is intangible and non-territorial, and constitutes our real *Global Commons,* existing within and beyond all borders. Its lack of acknowledgement by International Law results in its invisibility within the community of nations and peoples. Therefore, its legal non-existence authorises its deregulated use and consequent *tragedy* for our global common asset, reduced to the category of "externality".

Legal sciences have long acknowledged the existence of intangible legal assets as a solution to protect certain interests or assets which became relevant to human societies. UNESCO's intangible cultural heritage, copyrights, or the intangible value of companies (where the value of intangible assets is often exceptionally higher than that of tangible assets) are some examples.

The analogy between these intangible objects of law and the Earth System may be crucial not only to represent the global and indivisible functionality of the Earth System in the bosom of the international community, but also to lend economic visibility to the real value of the intangible services provided by ecosystems and other features of the Earth System (e.g., atmospheric and oceanic circulation) in maintaining global biogeophysical and biogeochemical cycles, whose value is exceptionally higher than the tangible value of the component systems which produce them.

A significant part of the challenge of "Transforming the World" entails the possibility of making the work of the Earth System visible in society, human actions, and economic and financial transactions. Nowadays, the value of nature only becomes visible in financial transactions through its destruction and transformation into raw materials, as happens with the timber of forests.

The objective is to put forward a proposal so that the favourable state of the Earth System as a whole, which is represented by the current geological epoch, the Holocene, is recognised as Intangible Common Heritage of Humanity. The objective is to promote this new global legal asset as a "coordination platform", where all positive and negative *externalities* can be aggregated and accounted for. This new object of global governance will coexist with the legal frameworks of state sovereignties: one **Planetary Condominium**. The condominium is the only existing legal model which is not limited to a division of spatial elements, but also recognises the existence of non-spatial functional elements (e.g.: electricity, water), and, for that reason, is able to ensure multi-level governance aimed at maintaining the integrity of the building as an integrated whole.

If we use different types of legal division (functional and spatial) it is possible to have the peaceful coexistence of two overlapping, but coordinated, legal frameworks within the same physical space. With the proper scale adjustment, the theory which results from this solution could have profound meaning in the legal organisation of human societies in the two horizons they share - the Common Home of Humanity: on the one hand, State jurisdictions (territorial elements) over which it is possible to apply legal conventions of division, and, on the other hand, coupled and overlapping, the safeguarding of the indivisible Earth System (non-territorial elements).

The legal recognition of this intangible asset which **unites us all** at a global scale is a structural condition to lend visibility to the vital factors which sustain life, and to start a process in which the permanent maintenance of the Common Home will not be an economical loss to those who provide common benefits. This is an opportunity to transform peoples and nations into subjects of an actual humanity and to achieve civilizational transformation, from a community of Earth System exploiters to a community of Common Home curators and managers.

Keywords: Common Heritage of Humankind, Intangible Nature, Earth System, Common Home of Humanity, Intangible Global Commons, Human Ecology, Environmental Law, Global Governance, Planetary Boundaries.

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PARTE I

INTRODUÇÃO

1. Motivação e Justificação para o Tema

Podemos afirmar que o período de estudos desta tese prolongou-se de forma continua desde 2006. No entanto o motivo seminal deste projeto de construção de uma arquitetura jurídica mais adequada ao funcionamento global do Sistema Terrestre teve origem ainda anteriormente. Em Novembro de 2002 o acidente do petroleiro *Prestige* na costa galega perto da fronteira portuguesa causou uma enorme maré negra, que se espalhou desde o norte de Portugal até Vendée em França. Até aqui, nada de realmente novo ou diferente relativamente a outras marés negras que infelizmente ocorreram já um pouco por todo mundo. O momento iniciador da construção de um novo conceito, surge com a primeira reação das autoridades espanholas, quando tentam rebocar o petroleiro para as águas territoriais portuguesas, como se o petróleo passasse apenas a ser um problema português e não continuasse a espalhar-se dois lados da fronteira... Analisando os motivos que estão na origem desta disfuncionalidade jurídica entre a realidade ambiental e as construções sociais, que levam a confundir as representações humanas com a própria realidade, percebi que a origem primária desta disfunção se encontra no direito e que competirá em primeira linha às ciência jurídicas encontrar soluções de adaptação entre as formas de organização social e o funcionamento do planeta que habitamos e que pertencemos.

Tendo participado nas ações de limpeza que à época se realizaram no norte de Portugal, voltando para casa depois de um longo dia de limpeza e reabilitação de aves oleadas, ao abrir a caixa do correio encontrei uma conta de milhares de euros para pagar, ao qual estava em anexo um orçamento relativo aos trabalhos de restauração no meu condomínio.

Percebi então que a maioria desse montante era para o restauro de janelas que estão no espaço interior do apartamento dos meus vizinhos da frente. Completamente intrigado, comecei a estudar a estrutura legal de um condomínio. Quanto mais eu lia, mais se tornou evidente que as referidas janelas não pertenciam ao vizinho que possuía a fração onde as janelas estão localizadas, mas eram sim compropriedade de todos os meus vizinhos que habitam o condomínio. Todos nós tínhamos não só uma titularidade comum sobre aquela janela e vários outros elementos do prédio, bem como a correspondente responsabilidade compartilhada pela sua manutenção, uma vez que a inexistência de manutenção destes elementos se iria refletir na habitabilidade de todo o prédio. Ao estudar em detalhe a construção legal que cercava a minha vida diária, percebi que esta estava cheia de significados teóricos e possibilidades que questionavam tudo o que me havia sido ensinado na Universidade ... Depois de alguns anos a tentar desvendar a complexidade desse modelo, percebi que a solução ali presente, porque tinha surgido como resposta a uma necessidade da vida real, nunca tinha sido devidamente dissecada pela doutrina nos seus múltiplos significados e dimensões. Como tudo o que não tem explicação é complexo, a doutrina espanhola chamara-lhe mesmo *propriedade complexa*. Hoje cada vez tenho mais a certeza de que a ligação que fiz entre a mancha de petróleo que existia de forma sobreposta com a linha imaginária que separa as águas territoriais e janela comum no interior da casa do meu vizinho, foi o momento em que se colocava em causa o paradigma de divisão de sobre o qual se alicerçava a disfunção entre o Sistema Terrestre e as sociedades humanas, do qual são parte integrante.

O processo de investigação começa ainda durante o ano de 2003, dando origem à publicação em 2007 do livro, "Condomínio da Terra – Das alterações climáticas a uma nova conceção Jurídica do Planeta", publicado pela Livraria Almedina, Coimbra. Em 2016 é publicado "SOS Treaty – Save Operating Space Treaty – A New Approach to Managing Our Use of the Earth System, pela Cambridge Scholars Publishing, em parceria com uma série de autores nacionais e estrangeiros, onde foram publicados de forma integral os capítulos 3,4,5 e 7 desta tese. Nesta linha de desenvolvimento do projeto, em Setembro de 2017 foi submetida uma proposta ao "Global Challenges Prize 2017: A New Shape – Remodelling Global Cooperation, que constitui o Capítulo 6 desta Tese.

A linha de investigação pluridisciplinar realizada durante estes anos, embora tenha dado origem a profundas evoluções na utilização e conjugação de instrumentos e consequentemente nas soluções encontradas, não deixou nunca de ter como esqueleto base as possibilidades oferecidas pelo modelo do condomínio, que ao fim deste período

julgo começar a ser desvendado na sua complexidade, e tornar-se simples e evidente o porquê da sua potencialidade.

Percebemos então que:

1) Num condomínio não existe apenas uma divisão do espaço. Existe igualmente uma divisão jurídica funcional relativa às funções essenciais: a estrutura de estabilidade, os sistemas de uso comum (água, luz, elevadores...) e os elementos funcionais (escadas, telhado, coberturas), que estão sobre o regime de propriedade comum. Quer isto dizer que todos elementos que asseguram a habitabilidade e funcionalidade do prédio no seu todo, e sobre quais não é possível nenhuma operação jurídica de divisão, nem mesmo abstrata, são comuns. Só posteriormente a esta divisão funcional, é que se procedeu à divisão jurídica abstrata dos espaços que irão ser objeto de direitos de propriedade privada.

2) Esta divisão funcional, tornava possível que no interior dos espaços sobre o regime de propriedade privada, existissem elementos e sistemas e que estavam sobre o regime jurídico de propriedade comum. Isto significa, que se utilizarmos diferentes de tipos de divisão jurídica (funcional e espacial) é possível assegurar a coexistência pacífica de dois regimes legais sobrepostos no interior do mesmo espaço físico.

3) Se acompanharmos esta dupla divisão, por um sistema de contributos diferenciados e equitativos entre a cada um dos vizinhos, com o objetivo de assegurar a gestão permanente do mesmo prédio materialmente indivisível, é possível harmonizar, conciliar e tornar simbioticamente interdependentes os interesses individuais e comuns, tendencialmente opostos e conflituantes.

4) Com a devida adaptação de escalas, a teoria que resulta desta solução poderia ter profundos significados na organização jurídica das sociedades humanas à escala do planeta - a Casa Comum da Humanidade: por um lado o planeta físico, geográfico e territorial sobre o qual é possível realizar abstrações jurídicas de divisão, e por outro, de forma acoplada e sobreposta, o Sistema Terrestre, uno e intangível, e sobre o qual não é possível realizar nenhuma divisão legal nem de forma abstrata.

5) Esta teoria, porque permite uma reconfiguração das relações que se estabelecem em torno da posse e uso de um mesmo bem, (em que a propriedade privada pode coexistir com a propriedade comum) permite-nos imaginar novas soluções para harmonizar as tensões entre o modelo económico que enaltece a divisão, a autonomia e a liberdade individuais, com a sempre necessária ação coletiva para assegurar a manutenção do bem comum global – Um Sistema Terrestre num estado favorável, e sobre o qual não é possível realizar nenhum tipo de divisão. Por outras palavras, o condomínio é um modelo de organização da interdependência, uma vez que só na prossecução do interesse comum, é possível assegurar o direito de cada um.

Partindo desta linha de raciocínio, a matriz metodológica foi marcada por sucessivas etapas de aproximação estratégica a várias áreas do conhecimento, integrando as duas abordagens ideológicas dominantes, que foram até hoje consideradas opostas e antagónicas no que diz respeito à estratégia de gestão de bens comuns. Partindo das possibilidades abertas pelo modelo do condomínio, este projeto funcionou como uma plataforma de encontro de muitas soluções já encontradas. Como afirmam Almeida et.al., (2010.10) "A falência das macro narrativas ideológicas, que afirmavam a excecionalidade humana (Dunlap et al., 2002), desde o capitalismo ao comunismo, confronta-se com a emergência do discurso ecológico. Este discurso reabilita a urgência de uma solidariedade intergeracional e a íntima ligação entre a política e a economia, concorrendo para o encontro de soluções e de responsabilidades coletivas. Contudo, se as questões ambientais globais suscitam soluções globais, ou a concretização de um largo espectro de compromissos internacionais, a experiência humana da existência é essencialmente fenomenológica e associada às rotinas da vida quotidiana (Berger et al., 1985)".

A descoberta e definição *Safe Operating Space of Humankind,* como espaço biogeofísico relativo à estrutura de concentrações biogeoquímicas do Sistema Terrestre, e, portanto, como espaço qualitativo não geográfico, possibilita-nos esse salto para o global, essa ligação entre o local e global, entre economia e politica nas suas dimensões locais e globais. Requer igualmente uma reorientação da perceção do que foi entendido até hoje como "Casa Comum da Humanidade": este espaço intangível, relativo às condições biogeofísicas que suportaram o desenvolvimento das sociedades humanas, não se refere ao planeta físico ou ao espaço geográfico/político, constituído pela soma das diferentes áreas sob jurisdição dos Estados e das áreas remanescentes. O conceito de Casa Comum tem subjacente as condições de habitabilidade da Casa na sua totalidade, que existem em simultâneo no interior e exterior de todas as soberanias. Neste sentido a Casa

Comum da Humanidade não deverá ser entendida como o planeta geográfico de 510 milhões de km2, mas antes deve ser representada através do *favorable well-defined state* do Sistema Terrestre, relativo ao período geológico do Holoceno. E é esta dimensão qualitativa que escapa à abordagem territorial. Em termos geográficos um oceano morto e acidificado pode continuar a ser objeto de divisões jurídicas entre soberanias, mas não pode servir como suporte da vida marinha e da humanidade no seu todo. Da mesma forma um planeta com um estado do Sistema Terrestre indesejável que não é capaz de suportar as necessidades ecológicas da espécie humana, também não pode ser considerado como nossa Casa Comum.

Esta dimensão funcional e qualitativa, será então a linha mestra de toda esta investigação, que busca nos novos conhecimentos sobre o funcionamento do Sistema Terrestre, a base científica sobre a qual se vai aplicar o modelo do condomínio, recorrendo sempre a conceitos e institutos jurídicos já construídos, e adaptando-as a esta realidade.

Por isso, para além das ciências do Sistema Terrestre, integram-se conceitos como Património da Humanidade, intangibilidade de objetos jurídicos, direito internacional, gestão de bens comuns, economia ecológica, valorização de serviços de ecossistemas, métricas e sistemas de contabilidade ecológica e o debate sobre os direitos das futuras gerações.

Na essência iremos procurar construir um objeto de direito que proceda a uma leitura mais aproximada da realidade ambiental, propondo-se uma cobertura jurídica internacional ao Sistema Terrestre, tornando possível desta forma, distinguir a dimensão espacial do planeta (o hardware), do sistema funcional global (Software) que suporta a vida na Terra.

Esta dimensão funcional e qualitativa do sistema terrestre pode ser determinante para se encontrarem os fundamentos sobre os quais se pode construir a Casa Comum que o Papa Francisco refere na sua Encíclica "*Laudato Si*". No seu entender essa Casa Comum ainda "não está ainda construída", quer isso dizer, que a nossa Casa Comum, não será o planeta físico ou geográfico, mas sim uma construção humana que potencie a construção simultânea de harmonia no interior das sociedades humanas e entre estas o Sistema Terrestre. *La Cura Della Casa Comune,* será então o cuidado na manutenção da estrutura de concentrações biogeoquímicas que determinam as condições favoráveis à família humana e a todas as espécies que partilham connosco as mesmas necessidades ecológicas. Cuidar da Casa, implica criar as condições estruturais prévias para uma ação coletiva

global. Por isso a Casa Comum da Humanidade, será construção jurídica baseada na ciência.

2. Metodologia e Objetivos gerais e específicos

a) Objetivos gerais

Assumindo-se a ecologia humana como área de investigação transdisciplinar privilegiada para a análise das interações entre os sistemas sociais e sistemas ecológicos, e que nos pode proporcionar uma leitura abrangente das mudanças sociais e ambientais que resultam dessa interação, iremos proceder a um possível desenho de compatibilização das características do funcionamento do Sistema Terrestre com a organização política e social da comunidade global humana. Esta abordagem será, na sua essência, realizada através da procura de um novo objeto de direito que proceda a uma leitura mais aproximada da realidade funcional do Sistema Terrestre, isto é, na busca de elementos de conexão e coerência entre o sistema jurídico e o sistema ecológico, especialmente através do recurso às recentes descobertas desenvolvidas pelas ciências naturais e à utilização, por analogia, aos objetos jurídicos intangíveis e ao modelo do condomínio. A abordagem escolhida é a de estudar e desenvolver a intangibilidade jurídica como eixo norteador capaz de traduzir e representar a essa qualidade intangível do bem ambiental global – o estado favorável do Sistema Terrestre. Sobre o assunto da intangibilidade jurídica César Garcia (2016.15) afirma: "Tamanha mudança somente se torna possível quando se deixa de pensar a realidade somente a partir do Direito, para permitir que o próprio Direito seja repensado a partir da realidade."

Ao desmaterializarmos a natureza através do reconhecimento de Património Comum Natural Intangível da Humanidade, ou para ser mais correto, ao aceitarmos que a natureza possui elementos não territoriais, poderemos distinguir o espaço soberano onde a infraestrutura natural está localizada, dos serviços e funções incorpóreas que presta no seio do sistema natural global, abrindo portas à valoração destes serviços imateriais.

Esta será a base jurídica que permitirá a construção de um sistema de contabilidade dos diferentes contributos de cada agente para o sistema natural comum que suporta a vida na Terra, e a construção de uma economia onde os ativos intangíveis naturais devem

ter um papel central, e que desta forma poderia resultar numa harmonização entre os fluxos económicos e os fluxos ecológicos.

A proposta de pensar a terra como um imenso condomínio, tem como objetivo central aproveitar uma ferramenta jurídica já amplamente testada de sobreposição de dois regimes legais distintos no interior do mesmo espaço, conciliando desta forma interesses individuais e coletivos, fornecendo assim uma base jurídica global que com potencial para enquadrar e contextualizar globalmente os interesses individualizados de cada um dos Estados com os interesses superiores de toda a Humanidade.

Esses interesses superiores existem, independentemente de não ser possível identificar os sujeitos de direito em relações futuras e incertas. Podemos não identificar em concreto os sujeitos, mas sabemos que algumas condições básicas vitais de habitabilidade do planeta são necessárias pelo simples facto de virem a ser seres humanos. Na certeza de que as gerações futuras possuirão existência em determinado momento histórico, e que os direitos humanos não estão ligados a um individuo em particular, mas uma humanidade que se alarga para lá da existência individual no espaço e no tempo, propomos representar estes interesses através de um património comum natural intangível. Esse será o legado da transmissão da Casa Comum, de geração em geração.

b) Objetivos específicos

1 – Demonstrar que a gestão do uso do Sistema Terrestre implica a organização de uma fruição coletiva à escala global, e que através do modelo do condomínio é possível compatibilizar um regime de soberanias territoriais independentes, com a gestão comum dos elementos não territoriais.

2- Demonstrar, que tal como noutras áreas em que o direito se viu obrigado a reconhecer juridicamente a existência de bens intangíveis para poder cumprir a sua função harmonizadora de relações, é chegado o tempo de o direito reconhecer a existência de um bem jurídico intangível global relativo à natureza, como plataforma a partir da qual deve montar um esquema regulador das relações entre indivíduos, Estados e comunidades, numa escala global.

3 – Para tal, o direito deve recorrer às últimas evoluções da Ciências do Sistema Terrestre, e com base no *Safe Operating Space of Humankind*, construir um objeto de representação intelectual relativamente a uma realidade natural, como bem jurídico intangível que existe no interior e exterior de todos os Estados, como pressuposto estrutural da construção de uma sociedade sustentável.

4 – Entre os instrumentos jurídicos existentes, aquele que melhor se adequa às características do "bem ambiental global" é o Património Comum da Humanidade. Neste sentido iremos propor uma evolução do *Common Concern of Humankind* para o reconhecimento do estado favorável do Sistema Terrestre como Património Natural Intangível da Humanidade, definindo dessa forma um bem jurídico global autónomo.

5- Usar o novo património natural intangível, como o "território virtual" em torno do qual a comunidade humana global se organiza, e onde os interesses das gerações futuras poderão estar representados.

6- Usar este novo património intangível como instrumento legal para internalizar as chamadas "externalidades económicas", positivas e negativas.

7- Com base nesta internalização, tornar possível a visibilidade económica destes fatores vitais, conectando desta forma os ciclos biogeofísicos com os ciclos económicos.

8 – Com base no novo Património Comum, promover a reativação do Conselho de Tutela da Nações Unidas, cujo novo mandato teria como objetivo principal a manutenção do espaço de segurança da Humanidade.

Capítulo I

Ecologia Humana – A Ciência do Conhecimento

"Pensar de uma maneira inovadora para poder inovar a própria realidade"
Viriato Soromenho-Marques (1994:26).

1.1. Introdução

A natureza, sabemo-lo hoje, é não-linear, e como tal traz consigo a ideia de multiplicidade, abertura, adaptabilidade, irreversibilidade e complexidade (Brown 1994 :420).

Nas primeiras palavras do prefácio da "Introdução ao Pensamento Complexo" Morin **introduz-nos um pensamento que não abandonamos mais sempre nos confrontamos com a palavra *complexo***: "Pedimos legitimamente ao pensamento que dissipe as brumas e as obscuridades, que ponha ordem e clareza no real, que revele as leis que o governam. A palavra complexidade só pode exprimir o nosso embaraço, a nossa confusão, a nossa incapacidade de definir de maneira simples, de nomear de maneira clara, de pôr ordem nas nossas ideias". Mais à frente afirma: "A palavra complexidade é uma palavra problema, não uma palavra solução" (Morin1990: 7).

Na época em que estas palavras foram escritas, os conhecimentos sobre as instruções operacionais intangíveis que determinam a forma como o sistema terrestre se auto-organiza e regula eram praticamente nulos e sua existência, ainda que num plano meramente teórico e conceptual, suscitava autênticos coros de rejeição. A hipótese de Gaia – em que James Lovelock (1991) formula pela primeira vez a possibilidade de o

Planeta Terra funcionar como um sistema vivo que se auto-regula, foi considerada pela Revista *Science* de 19 de Abril de 1991, uma teoria "anticientífica", "perigosa", "pura fantasia".

Hoje, depois de desvendados os *core drivers* que determinam o funcionamento do Sistema Terrestre, os cientistas do sistema global - os *Earth System Scientists* - continuam a defini-lo como um sistema altamente complexo, por duas ordens de razões: a) por lado existem ainda muitas interconexões desconhecidas, b) por outro, relativamente às interconexões já conhecidas, os efeitos cascata originados pela introdução de alterações nos seus componentes, que não podem ser analisados num modelo simples de causa-efeito, resultam em efeitos emergentes não conhecidos. Neste nível nenhum fator atua de forma isolada, antes pelo contrário, é um sistema onde "tudo depende de tudo" e onde "tudo implica com tudo". Esta tautologia tem na escala global o seu campo perfeito de aplicação.

Mas se para chegar a esta consciência da complexidade e de que "tudo depende de tudo", que só agora começa a ser reconhecidamente aceite, teve de se percorrer um "longo caminho onde apareceriam em primeiro lugar os limites, as insuficiências e as carências do pensamento simplificador, depois as condições nas quais não podemos evitar o desafio complexo" (Morin1990:8). Na esteira do pensamento disjuntor cartesiano, construímos uma estrutura de organização das sociedades humanas baseada no paradigma no conhecimento segmentado, limitativo e isolador de cada área do saber, e que separa e oculta tudo o que liga, interage, interconecta, tornando impercetível o erro e as falhas das interligações. "Infelizmente, a visão mutiladora e unidimensional paga-se cruelmente nos fenómenos humanos: a mutilação corta a carne, deita sangue, espalha sofrimento. A incapacidade de conceber a complexidade da realidade antroposocial na sua micro-dimensão (o ser individual) e na sua macrodimensão (o conjunto planetário da Humanidade) conduziu a infinitas tragédias e conduz-nos à tragédia suprema" (Morin 1990:19).

O "império dos princípios de disjunção, de redução e de abstração", cujo conjunto Morin chama de "paradigma de simplificação" isolou radicalmente, na opinião de Morin, cada um dos três grandes campos do conhecimento científico, relativamente a cada um dos outros - a física, a biologia, as ciências do homem.

Com Hobbes, o paradigma cartesiano invade também o direito e este torna-se numa arte de estabelecer limites, de fazer a separação das coisas, de desenhar fronteiras abstratas, naturalmente ocultando a realidade então desconhecida do Sistema terrestre,

que existe para além da dimensão territorial do planeta e cuja única escala de funcionamento é a global. É igualmente sob a visão ainda dominante do paradigma da divisão, que emerge um modelo económico que defende que só o regime de propriedade privada em associação aos mecanismos de mercado está apto a ultrapassar a inevitável "Tragédia dos Bens Comuns" (Hardin 1968), uma vez que nesta linha de raciocínio apenas as pessoas com propriedade privada seriam motivadas a proteger suas terras do uso desregulado. A todos os níveis os sistemas de conhecimento e de organização social foram formatados para definir limites e não partes comuns. A formatação social daqui resultante pode-se resumir desta forma: a) tudo o que interliga e ultrapassa fronteiras é socialmente invisível; b) pensar global é uma quimera desconectada da realidade social; c) representar socialmente o global, uma impossibilidade técnica e categórica.

Nesta linha de pensamento compreende-se que ainda hoje o que é o comum seja apenas o remanescente das divisões operadas pelas soberanias ou pela propriedade privada.

As falhas estruturais resultantes desta ausência de interconexões no próprio sistema de conhecimento e do sistema e organização social, deram origem a um processo interno de erosão, como sequência lógica da incapacidade destes sistemas em explicarem adequadamente a realidade natural e social. O resultado foi o alargamento da "fatalidade" da lógica da "Tragédia do Comuns" a uma realidade oculta e "externa" - a escala global. As alterações climáticas, como fenómeno mais visível de toda a ameaça ao estado do Sistema Terrestre, são uma Tragédia dos Comuns à escala global – a disrupção dos mecanismos de suporte da vida - a Tragédia Suprema, nas palavras de Morin.

No plano jurídico, como plano estrutural da organização das sociedades humanas, esta *territorial obsession* (Taylor 2016:120), tem como expressão máxima a abstração jurídica de considerar o planeta apenas num plano unidimensional, onde este corresponde a uma área total de 510.000.000 de km2 que foi dividida entre as soberanias e onde os *Global Commons* são apenas os remanescentes destas divisões. Este continua a ser o modelo único que determina o ponto a partir do qual todas as realidades são analisadas.

Como afirma Soromenho-Marques (1994:17) "O homem age antes de saber". Mas quer queiramos ou não, foi esta separação/organização/isolamento que possibilitou alcançar uma espantosa rede de informações sobre o mundo, que nos permite agora, quase como observadores externos, questionar todo o caminho já realizado.

Na posse de tantas informações parcelares, podemos agora ambicionar passar da informação ao conhecimento do todo e, dar um passo decisivo no percurso civilizacional

da humanidade. Para isso, é necessária uma operação, uma conexão entre a complexidade objetiva da natureza e a nossa capacidade subjetiva de a representar no nosso sistema social.

É nesta conjuntura que surge a Ecologia Humana, que como próprio nome indica, pretende ser um espaço de conhecimento onde as informações provindas de todas as ciências, naturais ou humanas, se encontram e de alguma forma formarão um conhecimento global e integrado.

Mas como é evidente, um projeto de construir uma ciência unificadora, num contexto social profundamente enraizado em conhecimento espartilhado, não é tarefa fácil. Embora seja hoje recorrente a utilização das palavras inter, trans ou multidisciplinaridade, a utilização de palavras por si só não significa que esse conhecimento integrado seja uma realidade. Em muitos casos, o exercício de nomeação destas palavras corresponde apenas a uma proclamação da necessidade de encontrar uma ideia para um problema ainda não resolvido, como metodologia que incentive ao diálogo entre pessoas que foram formadas em diferentes silos, mas que muitas vezes são incapazes de correr o risco de sair da sua área de especialização, da sua zona de segurança e criar um conhecimento verdadeiramente integrado. A inter, trans ou multidisciplinaridade nasceram como quase-conceitos, em que a sua validade atual se encontra como um inegável e necessário projeto futuro ainda não realizado.

No entanto, este *dever-ser* futuro confronta-se ainda hoje com problemas de afirmação relativamente às teias das compartimentações dos saberes estabelecidos, onde o "transdisciplinar" não encaixa nos modelos de validação e delimitação existentes. Como Iva Pires refere, a Ecologia Humana é uma ciência altamente especializada mantendo, ao mesmo tempo, uma visão holística, abrangente e transdisciplinar, condição que a torna complexa e mesmo difícil de ser definida (Pires 2011).

Neste caminho de afirmação para Mcharg (1984: 53) "O principal desafio que se coloca à ecologia humana é da capacidade de síntese dos processos físicos, biológicos, sociais, económicos e culturais para compreender as pessoas os lugares, observar as relações sistémicas e comentá-las". Quando o projeto em causa tem como objetivo interconectar as informações e transformá-las em conhecimento, parece-nos que não poderemos fazer depender a sua validação do cabal preenchimento do princípios estruturais formais das metodologias científicas herdadas do paradigma da disjunção - onde se constatou que "os modos simplificadores do conhecimento mutilam mais do que

exprimem as realidades ou fenómenos que relatam, e se torna evidente que produzem mais confusão que esclarecimento..."(Morin 1990:7).

Mas o processo de transformação da informação em conhecimento é um longo percurso, que por ser inevitável, começou já a ser feito parcelarmente em várias áreas científicas, entre quais, a que consideramos mais evoluída e de maior relevância, será a das ciências naturais – as chamadas ciências do Sistema Terrestre - onde a biologia não está separada da química, matemática, geologia, paleontologia, climatologia ou da física. Os ciclos biogeofísicos globais, pela sua própria formulação, são um sinal evidente da unificação dos saberes na única e verdadeira escala em que podemos transformar informação em conhecimento – a escala global. Esta evolução inevitável para entender e representar o "todo global", está ainda longe de possuir uma lógica consistente à escala das ciências humanas.

1.2. Da *Terra Incognita* às Ciências do Sistema Terrestre

Com a visão do Príncipe Infante D. Henrique foi possível iniciar o processo de transformar a *Terra incognita* (termo utilizado na cartografia dos séculos XV/XVI para assinalar as regiões nunca mapeadas ou documentadas) em Terra conhecida. Esta epopeia de descoberta culmina de alguma forma com a viagem de Fernão de Magalhães, onde pela primeira vez na história se pôde voltar ao ponto de origem sem voltar para trás, e se percebeu a forma e os limites físicos da nossa Casa Comum. Sabemos hoje, que este passo de gigante na história da perceção que a espécie humana tem do planeta que habita, era apenas ao nível do espaço geográfico.

Depois das "*Terra Incognitas*" terem desaparecido dos nossos mapas, tivemos que esperar até à segunda metade do Século XX para perceber que para além do planeta na sua dimensão geográfica, física e palpável, existia um sistema funcional global, cujo o modo de funcionamento estava ainda por descobrir. Quando Lovelock percebeu, nos finais dos anos 60 do Séc. XX que os CFC's emitidos para a atmosfera não desapareciam no espaço infinito e acumulavam-se nos polos, uma nova realidade se revelou. De passo em passo a ciência foi desvendando o nível superior de integração do Sistema Terrestre, de interconexões globais de difícil definição.

Com o desenvolvimento exponencial das ciências do Sistema Terrestre ocorrido nos últimos 25 anos e a evolução das observações da Terra realizadas a partir do espaço, o sistema incrivelmente complexo do planeta que habitamos transformou-se numa realidade que podemos observar em tempo real, como espectadores externos.

Ao juntarmos a informação obtida partir do espaço com a informação recolhida a partir do solo e do gelo (por exemplo a paleontologia do clima), tornou-se possível reconstruir a história da atmosfera e todo o Sistema Terrestre. Ao longo da história do nosso planeta, foram muitas as diferentes estruturas de composições químicas da atmosfera e dos oceanos, que deram origem a diferentes balanços energéticos e equilíbrios termodinâmicos, que por sua vez resultaram em diferentes estados do Sistema Terrestre. O acesso a esta informação permitiu-nos a compreender a verdadeira situação única que caracterizou o período de estabilidade climática dos últimos 11.700 anos no Planeta Terra, o chamado o período geológico do Holoceno.

Se é a partir de Portugal que saem muitas das naus nas viagens oceânicas dos séculos XV e XVI que iniciam o processo de reconhecimento do espaço geográfico global da nossa Casa Comum, não deixa de ser interessante o facto de a unificação das ciências naturais, e o consequente processo de decifração do funcionamento do sistema terrestre, ter ligações com Portugal, como afirma Will Steffen, Executive-Director do IGBP (International Geosphere-Biospehere Program) e editor principal do "Global Change and the Earth System" de 2004 (considerado ainda hoje o estudo mais abrangente sobre o Sistema Terrestre) : *"In fact, this rapidly emerging knowledge of the Earth as a single, integrated system also has some interesting connections to Portugal. One the first conceptualization in the contemporary era of the Earth as a system was by James Lovelock, who used the name "Gaia" (name of the Greek Goddess of Earth) for the Earth System. This, of course, is the name of the city that sits across the Douro River from Porto, and the combination of the twin cities Porto and Gaia formed the basis for the name of the country as Portugal.*

Arguably the most influential international scientific body in the development of the concept of the Earth System has been the International Geosphere-Biosphere Programme (IGBP). Interestingly, the most critical meeting of the IGBP Scientific Meeting was held in 1999 in Estoril, Portugal[1]*. There the Committee determined the objective, scope and work plan for the production of the IGBP synthesis project, which resulted in the book*

[1]http://www.igbp.net/download/18.950c2fa1495db7081e131/1416232597277/NL_371999.pdf

"Global Change and the Earth System: A Planet Under Pressure", still one of the best syntheses of Earth System science. The Estoril meeting also initiated the planning for the 2001 Amsterdam Conference, which was the world's largest global change scientific conference up to that time.

The Estoril meeting also featured an explicit link to Ferdinand Magellan and the age of Portuguese exploration. The IGBP Scientific Committee visited the Portuguese Academy of Sciences in Lisbon, where the scientists had the fortune to see the original navigational maps of Ferdinand Magellan, where for the first time the islands of Japan appear on a map in the western world.

Inspired by this link to the great age of global exploration, the IGBP Chairman Berrien Moore III, as he looked out over the Atlantic Ocean from the conference room in Estoril, challenged the IGBP scientific community to go out on their own voyage of scientific exploration to understand our home planet as a single system – our own life support system.

So, from the perspective of Earth System science, it would be truly fitting for the Common Home of Humankind to be located in Portugal, and in Porto in particular"

Como referido, esta 14[aa] reunião Scientific Commitee do IGBP que decorreu entre os dias 23 a 27 de Fevereiro de 1999 no Estoril, esteve na origem da evolução do conceito avançado por Lovelock, que viria a resultar numa abordagem integrada e pluridisciplinar no âmbito das ciências naturais ao Sistema Terrestre como um único todo. Esta evolução resultou na prática num processo gradual de unificação das ciências naturais – que estão na base e origem das chamadas Ciências dos Sistema Terrestre.

Na sequencia da reunião do Estoril, e numa parceria do IGBP e de outros programas internacionais de mudança global, ficou decidida a realização de uma grande conferência em Amsterdão em 2001, que marcou em definitivo a formalização desta unificação científica. A conferência produziu a histórica Declaração de Amsterdão sobre Ciência do Sistema da Terrestre, que reproduzimos aqui:

The Declaration[2]

The scientific communities of four international global change research programs - the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme on Global Environmental Change (IHDP), the World Climate Research Programme (WCRP) and the international biodiversity programme DIVERSITAS - recognise that, in addition to the threat of significant climate change, there is growing concern over the ever-increasing human modification of other aspects of the global environment and the consequent implications for human well-being.

Basic goods and services supplied by the planetary life support system, such as food, water, clean air and an environment conducive to human health, are being affected increasingly by global change.
Research carried out over the past decade under the auspices of the four programmes to address these concerns has shown that:

- The Earth System behaves as a single, self-regulating system comprised of physical, chemical, biological and human components. The interactions and feedbacks between the component parts are complex and exhibit multi-scale temporal and spatial variability. The understanding of the natural dynamics of the Earth System has advanced greatly in recent years and provides a sound basis for evaluating the effects and consequences of human-driven change.
- Human activities are significantly influencing Earth's environment in many ways in addition to greenhouse gas emissions and climate change. Anthropogenic changes to Earth's land surface, oceans, coasts and atmosphere and to biological diversity, the water cycle and biogeochemical cycles are clearly identifiable beyond natural variability. They are equal to some of the great forces of nature in their extent and impact. Many are accelerating. Global change is real and is happening *now*.
- Global change cannot be understood in terms of a simple cause-effect paradigm. Human-driven changes cause multiple effects that cascade through the Earth System in complex ways. These effects interact with each other and with local- and regional-scale changes in multidimensional patterns that are difficult to understand and even more difficult to predict. Surprises abound.
- Earth System dynamics are characterised by critical thresholds and abrupt changes. Human activities could inadvertently trigger such changes with severe consequences for Earth's environment and inhabitants. The Earth System has operated in different states over the last half million years, with abrupt transitions (a decade or less) sometimes occurring between them. Human activities have the potential to switch the Earth System to alternative modes of operation that may prove irreversible and less

[2] http://www.igbp.net/about/history/2001amsterdamdeclarationonearthsystemscience.4.1b8ae20512db692f2a680001312.html

hospitable to humans and other life. The probability of a human-driven abrupt change in Earth's environment has yet to be quantified but is not negligible.

- In terms of some key environmental parameters, the **Earth System has moved well outside the range of the natural variability exhibited** over the last half million years at least. The nature of changes now occurring simultaneously in the Earth System, their magnitudes and rates of change are unprecedented. **The Earth is currently operating in a no-analogue state.**

On this basis, the international global change programmes urge governments, public and private institutions and people of the world to agree that:

- An ethical framework for global stewardship and strategies for Earth System management are urgently needed. The accelerating human transformation of the Earth's environment is not sustainable. Therefore, the business-as-usual way of dealing with the Earth System is not an option. It has to be replaced ¬ as soon as possible ¬ by deliberate strategies of good management that sustain the Earth's environment while meeting social and economic development objectives.
- A new system of global environmental science is required. This is beginning to evolve from complementary approaches of the international global change research programmes and needs strengthening and further development. It will draw strongly on the existing and expanding disciplinary base of global change science; integrate across disciplines, environment and development issues and the natural and social sciences; collaborate across national boundaries on the basis of shared and secure infrastructure; intensify efforts to enable the full involvement of developing country scientists; and employ the complementary strengths of nations and regions to build an efficient international system of global environmental science.

The global change programmes are committed to working closely with other sectors of society and across all nations and cultures to meet the challenge of a changing Earth. New partnerships are forming among university, industrial and governmental research institutions. Dialogues are increasing between the scientific community and policymakers at a number of levels. Action is required to formalise, consolidate and strengthen the initiatives being developed. The common goal must be to develop the essential knowledge base needed to respond effectively and quickly to the great challenge of global change.

A consequência imediata deste marco histórico foi o recente desenvolvimento exponencial das Ciências do Sistema Terrestre com a sua abordagem interdisciplinar e global, proporcionando-nos informações sobre a natureza e os limites da Época do

Holoceno, como o único estado do Sistema da Terra que possui, com certeza, as condições ecológicas necessárias para suportar sociedades humanas complexas e contemporâneas.

Com esta nova abordagem global das ciências naturais, ficou claramente demonstrado que o grande desafio ambiental será o de manter um estado relativamente estável e favorável do Sistema Terrestre.

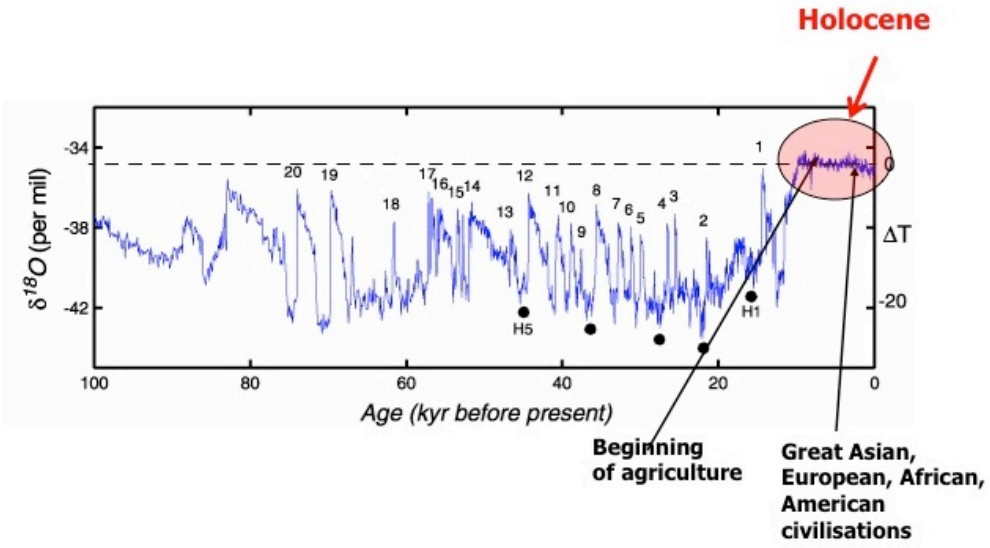


Figura 1. Record of $\delta^{18}O$ per mil (scale on left) from the Greenland Ice Sheet Project (GRIP) ice core, a proxy for atmospheric temperature over Greenland (approximate temperature range on °C relative to Holocene average is given on the right, showing the relatively stable Holocene climate during the past ca. 10,000 years and Dansgaard-Oeschger events (numbered) during the preceding colder glacial climate (Ganopolski and Rahmstorf 2001). Note the relative stability of temperature for the last 11,700 years (the Holocene) compared to the earlier ice age period. (Steffen2016:24)

Esta afirmação significa também que um Planeta com um Sistema Terrestre fora desse estado favorável, não serve como nossa "Casa Comum", o que tem como consequência imediata a desterritorialização do bem ambiental e a assunção da escala que vai determinar todos os processos locais: a escala global.

A comunidade científica tentou responder ao desafio de entender e medir este espaço qualitativo e quantitativo, não-territorial, intangível e funcional, desenvolvendo o

conceito das *Planetary Boundaries* – os limites do planeta (*Planetary Boundaries*) (Steffen et al., 2015, Rockström et al., 2009). Esses limites são baseados nas propriedades intrínsecas do próprio sistema terrestre e que se definem através de uma combinação de indicadores (*core drivers)* que no seu conjunto são as instruções operacionais intangíveis que determinam o modo como o Sistema Terrestre se auto-organiza e regula. Por outras palavras, este conjunto de indicadores será o "código genético" do funcionamento do sistema terrestre que traduz em números as intuições iniciais de Lovelock, descrevendo o estado do sistema terrestre, através de um conjunto de limites cientificamente estabelecidos que definem um estado do Sistema da Terrestre baseado nos últimos 11.700 anos – a época do Holoceno - limites que devemos respeitar para manter o Sistema da Terrestre nesse estado favorável.

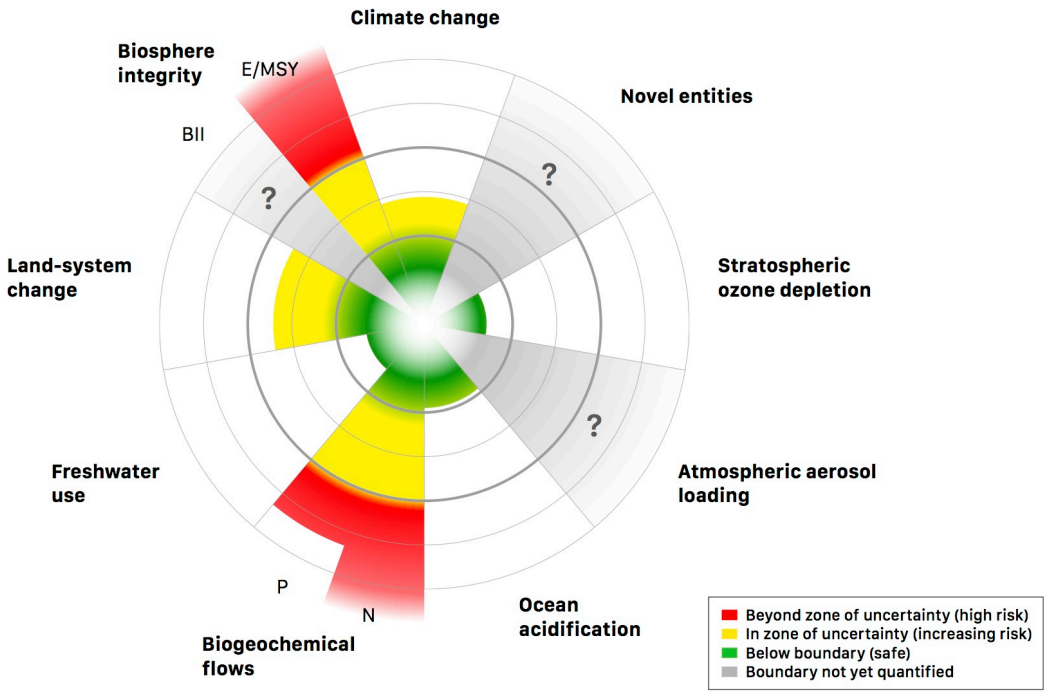


Figura 2. The current status of the control variables for seven of the nine planetary boundaries. Green zone is the safe operating space (below the boundary), yellow represents the zone of uncertainty (increasing risk), and red is the high-risk zone. The planetary boundary itself lies at the inner heavy circle. The control variables have been normalized for the zone of uncertainty (between the two heavy circles); the center of the figure therefore does not represent values of 0 for the control variables. The control variable shown for climate change is atmospheric CO_2 concentration. Processes for which global-level boundaries cannot yet be quantified are represented by gray wedges; these are atmospheric aerosol loading, novel entities and the functional role of biosphere integrity. Source: Steffen et al. (2015a).

A comunidade científica denominou estado favorável do Sistema Terrestre, como *Safe*

Operating Space of Humankind. Este "espaço" de operação segura para a humanidade é global, intangível, totalmente interdependente, indivisível e, portanto, um inultrapassável e incontornável bem comum. O conjunto destas características, tornou-se num dos fatores que mais desafia uma organização social ainda dominada por uma visão que considera que a gestão de bens comuns resulta numa inevitável "Tragédia dos Bens Comuns". Na impossibilidade de dividir o bem, a solução tem sido a de tentar minorar a dimensão da tragédia sem, no entanto, se proceder à necessária reorganização interna das relações imposta pelo uso compartilhado de um bem finito, indivisível e intangível. Sabemos hoje que existem alternativas e que em determinadas condições a ação coletiva é uma possibilidade.

1.3. A Ecologia Humana – Uma nova era no conhecimento?

Ainda que numa fase de consolidação, as ciências do Sistema Terrestre são resultado do confronto inevitável entre a segmentação parcelar das informações obtidas pelas várias ciências da natureza e o suprassistema da escala global, onde tudo interage e onde nada existe de forma isolada. Porque esta subida de escala é uma realidade incontornável para que se "dissipe as brumas e as obscuridades, que ponha ordem e clareza no real, que revele as leis que o governam" (Morin 1990:7), questionaram-se paradigmas, desenvolveram-se novas metodologias e novas formas de pensar para construir um novo conhecimento. Aliás sempre que a evolução técnica alarga o campo de visão do conhecimento e novas ciências surgem, uma série de novas perguntas e de reenquadramentos emergem como consequência natural. Na área das ciências da vida por exemplo, os novos conhecimentos deram origem a novos significados éticos. Nunes (2002:12) afirma mesmo que, "Uma ética fundada na dignidade humana pressupõe, necessariamente, que novos conhecimentos na área das ciências biológicas possam questionar axiomas considerados imutáveis, de modo a proporcionar - através de uma análise introspetiva permanente - uma mudança gradual da visão antropológica do homem".

Relativamente à Ecologia, ainda antes de se lhe adicionar a palavra humana, Soromenho-Marques (1994:16) já afirmava: "Nessa medida, a ecologia não se limita a ser mais uma ciência particular a adicionar a outras ciências a outras ciências particulares. No plano epistemológico, ela surge essencialmente como desafio conducente à

construção de um novo modelo de unidade das ciências, um novo *corpus* das ciências capaz de refletir ao nível dos métodos de trabalho e investigação essa profunda unidade objetiva do homem com todos os outros habitantes deste pequeno, mas magnífico mundo planetário."

Este exercício de confronto e conexão dos novos conhecimentos das ciências do Sistema Terrestre com os velhos axiomas das organizações sociais, será mesmo uma condição categórica para aferir a intencionalidade do agir humano, na sua relação com o sistema envolvente. Desta forma, esta aferição prévia será igualmente pressuposto de legitimação e validação das construções sociais humanas.

Daqui resulta que nos parece inevitável que a descodificação dos *core drivers* que determinam o funcionamento do Sistema Terrestre e dos suportes da vida, constituam informações que em muito deverão condicionar e moldar os paradigmas até hoje construídos e que continuam a ser considerados imutáveis. Um Sistema Terrestre interdependente e indivisível, se foi e continua a ser um enorme desafio para as ciências naturais, será ainda maior no caso específico das ciências sociais. Pelas suas interligações e escala é um desafio à forma de pensar e a tudo o que isso representa.

A questão coloca-se desde logo porque, como afirma Corraliza (1997:27), a "*Crise ambiental es una expresion infeliz, ya que más bien se trata de problemas de-la-humanidad"*. Se nos lembrarmos também que foi a atividade humana que provocou os chamados "problemas ambientais" e que essas alterações ambientais, por sua vez, irão interferir na qualidade de vida dessas mesmas pessoas, concluiremos que esses problemas são, na verdade, problemas da humanidade. Portanto, a origem dos problemas há que buscá-la na deficiente adaptação das sociedades humanas às circunstâncias que impostas pelo meio em que se encontram. Soromenho-Marques (1994:65) vai mais longe e faz a síntese: "A Natureza já não é mais do que uma forma diferida do homem falar de si próprio, um campo onde se projetam os seus sonhos, a sua desmesura, a sua paixão de infinito".

Posteriormente, foram as próprias Ciências do Sistema Terrestre, que vieram ao encontro desta visão e ainda a tornaram mais integrada. Os problemas do ambiente são problemas do homem, uma vez que a espécie humana é parte integral do Sistema Terrestre: *"The Earth System is defined as the interacting physical, chemical and biological processes that cycle materials and energy throughout the system at the planetary level. Importantly, humans and our activities are an integral part of the ES (Oldfield and Steffen 2004). It is critical for the planetary boundaries framework to*

recognize that the Earth System is a ***single complex system*** *that exists in well-defined states like all complex systems, the ES exhibits threshold/abrupt change behaviour in aspects of atmospheric and oceanic circulation, which, if triggered, would create serious risks for human well-being (Steffen 2016:24).''*

O auto-isolamento conceptual da espécie humana relativamente à sua dependência sistémica no seio do Sistema Terrestre, será com certeza uns dos maiores erros na história das perceções humanas: "A ecologia tradicional, ao se preocupar tanto com os aspectos físicos e bioquímicos da natureza, solidificando uma ecologia dos bichos e outra ecologia das plantas, deixou de fora um grupo-chave para o entendimento das dinâmicas dos ecossistemas: a espécie humana, objeto-sujeito da Ecologia Humana." (Marques 2011.86). É neste contexto que a Ecologia Humana surge com a tarefa de colocar "um fim na antítese entre natureza e a sociedade, significando que a natureza não pode ser mais percebida fora da sociedade, ou a sociedade fora da natureza, os problemas ambientais não são problemas do ambiente que nos rodeia, mas antes inteiramente problemas sociais. São uma forma peculiar de problemas sociais, já que apesar de representarem problemas para a sociedade, embora parecem ser problemas no ambiente (Yearley, 2004:87).

O projeto de integração dos novos conhecimentos obtidos pelas ciências do Sistema Terrestre implica subir ainda mais na escala das interligações, procedendo-se a uma conexão entre as ciências sociais e as ciências naturais, tornando o desafio da Ecologia Humana verdadeiramente civilizacional.

A tarefa é tudo menos simples e requer também por parte dos teóricos da Ecologia Humana um novo pensamento, que não fique refém das metodologias e sistemas de validação construídos sob o paradigma disjuntivo. Desde logo, o problema de definição de um objeto científico autónomo deve *ab inicio* demarcar-se da preocupação da sua validação e delimitação relativamente às ciências previamente estabelecidas: "A dinâmica da Ecologia Humana em sua base científica tenta, dentro das condições propostas, incorporar em si um pouco de cada área, sobretudo na tentativa de compreender, analisar e valorar não apenas o homem ou o entorno. A sua essência, na verdade, parte da construção de uma base filosófica do espaço-tempo na formação do individuo e do coletivo. Por este motivo, não há como negar sua importância, especialmente na evolução do conhecimento das ciências "não-tecnológicas", tornando-se um marco de visão interdisciplinar, revolucionando a visão académica, sobretudo a sociologia e antropologia modernas que viram nas bases da ecologia teórica um novo

marco científico como fonte de pesquisa integracionista. Assim, pode-se dizer que a sua expressão é fruto de uma relação concreta e de forte interdependência do *Antropo,* decorrente de sua ação direta ou indireta com o meio físico-natural. "(Alvim 2014:23)

Uma ciência que desde a sua formulação inicial pretende colher saberes de todas as outras ciências, que "coloca gente nos ecossistemas e situa-se nas inquietações sobre essa relação entre a espécie humana e os ecossistemas." (Marques 2011:86), que tem como ambição fazer pontes e integrar o todo tornando-se a *Unifying Science*, Bruhn (1974:105), tem obviamente um longo percurso a fazer na afirmação de um campo de estudo sobre o todo, onde a ausência limitações vai continuar a ser um dos principais obstáculos ao seu reconhecimento. Bruhn (1974:119) faz um estudo aprofundado em que tenta distinguir a Ecologia Humana das ciências já estabelecidas e dissipar a relutância dos "*self-interests"* dos saberes especializados em aceitarem uma ciência unificadora: *"It would appear that the major limitation in human ecology becoming a unifying science is the self-interest of disciplines and the hence an incomplete conceptualization of man-environment relations. There are viable but as yet largely untested schemes for studying and understanding man-environment relations as a series of interdependent systems. For example, Michaelson (1970) states that space has been used as a medium in ecological studies rather than a variable with a potential effect of its own. Similarly, environment has been referred to by human ecologists as the social environment without regard to how the physical environment supports or elicits certain social behavior.* ***When the social and physical environments are viewed as interdependent systems,*** *it is possible to examine how changes in the state or variables in one system affect the state or variables in the other (process). In addition, it is possible to study the coexistence of variables or factors that bring about congruence (adaption) or incongruence (maladaptation) as the two systems interact. He notes that, since any relations existing between environment and social behavior are a function of cultural values and perceptions, it is important to investigate the way in which physical, social and cultural variables articulate with each other to elicit observed behavior."*

Na nossa análise, o estudo das inter-relações entre sistemas sociais e Sistema Terrestre, que revelam adaptação ou não-adaptação na interação dos dois sistemas, será o fator determinante para que seja possível o reconhecimento desse estatuto de *overview science,* no caso de este estudo ser realizado com o objetivo da procura de soluções. Como afirma novamente Bruhn (1974.120) *"If Human ecology is concerned with the interrelationships between man and this environment and with the process that affect changes in these*

interrelationships, it is apparent that single disciplinary studies of these processes can provide only small glimpses of the total ecological complex. While theoretical debates among disciplines and reformulations of human ecology are sometimes fruitful, what is perhaps most disturbing is that the concepts, principles, and methods of human ecology used in geography, anthropology, sociology, and psychology are not so different to justify the lack of interdisciplinary studies. While is not popular to advocate such studies in universities or to propose that research be more oriented toward reaching solutions to current human ecological problems, these appear to be worth serious consideration if human ecology is indeed to ever become, in practice, a unifying science."

Se a "necessidade de **procurar respostas** para compreender as complexas interações entre processos sociais, económicos e ecológicos marcou em definitivo o carácter interdisciplinar da ecologia humana" (Pires; Craveiro 2010:26), e que levou igualmente à "necessidade de produzir conhecimento para compreender a relação do homem com o seu ambiente, para responder à interrogação de qual o seu lugar na natureza" (Pires; Craveiro 2011:15), estão criados os pressupostos programáticos iniciais para que a Ecologia Humana possa ambicionar ser essa ponte instrumental de procura de soluções integradas baseadas na investigação pluridisciplinar.

Se entendermos esta "relação entre homem e o ambiente" na sua devida escala – a escala global - colocando a Humanidade no seio do Sistema Terrestre, e se o estudo destas relações tiver como finalidade última a procura de soluções para transformar a não–adaptação do modelo existente em propostas de adaptação, estarão criadas as condições necessárias para que a Ecologia Humana possa aspirar a ser reconhecida como uma ciência verdadeiramente unificadora *per se*.

1.4. Uma Ecologia Humana à escala do Sistema Terrestre

Se o motivo fundador da ecologia humana surge como um resultado emergente da crise de adaptação do homem ao ambiente, era inevitável que esta ciência também trilhasse o caminho que as próprias ciências ecológicas trilharam. Nas últimas três décadas assistiu-se a uma ênfase nas perspetivas dedutivas, simplificadoras e experimentais para estudar a estrutura e a dinâmica dos sistemas ecológicos. As análises empíricas tendiam para efetuar manipulações, em pequena escala e no curto prazo, de

sistemas relativamente simples, a fim de investigar as interações entre espécies e entre organismos e o respetivo ambiente abiótico. Nos anos mais recentes, porém, um número crescente de cientistas começou a adotar programas de investigação muito mais holísticos. Esta viragem foi produto, numa parte, da necessidade prática de estudar os problemas ambientais causados pelos próprios seres humanos e, noutra parte, dos avanços conceptuais, metodológicos e tecnológicos registados no estudo do Sistema Terrestre.

Esta evolução entre a fragmentação e a progressiva aceitação do desafio do complexo, já anteriormente identificado por Morin (1999), foi igualmente inevitável neste percurso da Ecologia Humana. Depois de uma fase inicial em que o objeto do estudo da Ecologia Humana estava centrado na análise do uso e apropriação do espaço por parte das comunidades humanas e nas relações decorrentes entre estas comunidades com esse espaço local de suporte, desta fase inicial em que não existia uma clara distinção entre o objeto desta nova ciência e o trabalho realizado pela Geografia Humana ou pela Antropologia, surgiu a necessidade da transição de uma análise centrada no uso e apropriação do espaço, para uma análise sistêmica em que o objeto do estudo passou a ser constituído pelas relações que as comunidades humanas estabelecem com o ambiente, e desta forma consolida-se como campo plurisdisciplinar por excelência.

Ora, desta evolução da análise das relações com o "território", para a análise sistémica dos "processos económicos e ecológicos", sustentamos que o fator estrutural da afirmação e autonomização da Ecologia Humana passa pela assunção de um processo de "desterritorialização" do objeto de estudo. Tendo em conta que estes processos ecológicos são na sua essência globais, a escala de estudo terá de se compatibilizar com a escala dos processos. Como afirma Mcharg (1984:53) "O principal desafio que se coloca à ecologia humana é da capacidade de síntese dos processos físicos, biológicos, sociais, económicos e culturais para compreender as pessoas os lugares, observar as relações sistémicas e comentá-las". Iva Pires (2011:25) defende mesmo a perspetiva de que a "Ecologia Humana seja pensada como esforço para uma inadiável compatibilidade entre Socioesfera e Biosfera". Se o desafio na Ecologia humana for realizado no contexto da escala das relações entre a comunidade global (humanidade) e o meio envolvente (o planeta e o sistema terrestre que suporta a vida), independentemente das leituras locais parciais que possam ser realizadas, esta abordagem poderá constituir a grande novidade que a Ecologia Humana pode trazer ao conhecimento, unificando-o e demarcando-se das várias áreas de conhecimento que integra e incorpora. A Ecologia Humana seria assim uma ciência que emerge da interação de todas as outras áreas de conhecimento, criando

uma nova, que como fenómeno emergente, seria mais do que a mera soma das partes. O carácter pluridisciplinar da Ecologia Humana fica bem patente na diversidade de áras temáticas das suas publicações indexadas na base de dados SCOPUS onde cerca de 50% pertencem à área das ciências sociais e a outra metade está distribuída pelas ciências do ambiente, medicina, ciências da terra, ou agricultura, entre as principais (Pires, et al, 2017).

A legitimidade de todo e qualquer conhecimento, como demonstram previamente Camillieri e Falk (1992), depende do seu poder explicativo para retratar a realidade conhecida. A aceitação/afirmação de uma nova ciência, mais do que o resultado de teorizações ou tentativas de explicações com o intuito de distinguir e afirmar um novo ramo de construção de conhecimento, irá depender dessa capacidade de acuradamente descrever os factos e explicar da realidade e não de uma discussão centrada nos procedimentos e metodologias aplicadas.

Se o objetivo último será a própria unificação do conhecimento e a Ecologia Humana constitui-se como a ciência mais bem posicionada para desempenhar esta tarefa de conectar as informações, talvez seja mesmo necessário assumir a sua não delimitação, até porque essa delimitação seria sempre dependente das evoluções realizadas pelas outras ciências com que interage. Parece-nos que aceitação desta sua condição instrumento de conexões e de construção de sentidos, será mesmo um requisito estrutural para poder ambicionar ser esse sistema de pontes e interconexões. Neste sentido, a nova escala de trabalho das ciências naturais operada pelas ciências do Sistema Terrestre, parece-nos ser uma oportunidade única para evolução das construções sociais e para a afirmação da Ecologia Humana, como a ciência da visão integradora que avança na construção de novas soluções em função destes novos conhecimentos.

"A global solution to the sustainability challenge is thus a prerequisite for living sustainably at local and regional scales (Steffen et.at 2011:6)". Parece-nos ilusória a perspetiva de que a soma das atuações locais, poderão resultar numa mudança global. Mesmo as abordagens numa escala mais reduzida dependem sempre da sua contextualização numa abordagem global integradora, e essa tarefa estará inscrita no código genético da Ecologia Humana.

1.5. Uma Ecologia Humana à escala da Humanidade

Depois de um longo percurso de investigação empírica, Elinor Ostrom publica em 1990 o seu livro seminal "Governing the Commons" onde explora de forma inovadora sobre a possibilidade da gestão dos bens comuns não terminar fatalmente numa "tragédia". Tendo por base centenas de estudos realizados um pouco por todo o mundo, Ostrom demonstrou que a gestão partilhada de terras, água, florestas ou pescas, quando realizada sob a orientação de alguns princípios básicos que identificou, pode resultar num sucesso para todos. A demonstração desta possibilidade é de enorme importância e alcance uma vez que ela destrona a perspetiva de um modelo económico baseado exclusivamente nos livres mecanismos de mercado e propriedade privada, como única forma de evitar essa tragédia. Esta visão ainda hoje subscrita pela maioria dos economistas, foi na sua essência desenhada e popularizada com um famoso artigo escrito por um biólogo, Garret Hardin 1968, intitulado: "A Tragédia dos Bens Comuns". O exemplo apresentado, que se tornou já um clássico, é o seguinte: numa situação de uso partilhado de um pasto entre vários pastores, nenhum pastor individual irá ter um incentivo racional para se auto-limitar no uso do pasto comum. Desta forma, se um dos pastores trouxer uma cabeça de gado a mais, os outros pastores irão reagir da mesma forma, aumentando igualmente o número individual de cabeças de gado a pastar no terreno comum e o resultado será a sobre-exploração do pasto e a tragédia de todos. Esta linha de raciocínio implica que só através da divisão e atribuição de propriedade privada se poderá ultrapassar a inevitabilidade da tragédia dos comuns, pois apenas as pessoas com propriedade privada seriam motivadas a proteger e a auto-limitar o uso das suas próprias terras. O resultado final seria que a soma total destes comportamentos individuais iria ser benéfica para todos. Acontece que Hardin e todos os seus sucessores deturparam o conceito de bens comuns ao considera-lo um regime que apenas pode existir num completo livre acesso, que se realiza num cenário de ausência de total regras, onde não há limites para a apropriação do recurso, nem uma comunidade definida de usuários. *"But Hardin and others misrepresent the concept of the commons as an open-access regime, operating in a free-for-all scenario where there are no boundaries to the grazing land, no rules for managing it, and no community of users. However, a properly managed commons has boundaries, rules, monitoring of usage, punishment of free-riders, and*

social norms. A commons requires that, there be a community willing to act as a steward of a resource (Gautam 2016: 270)".

O *free-for-all scenario*, tem constituído a base estrutural que suporta a perspectiva da inviabilidade da gestão de bens comuns, e a inexistência de uma alternativa consistente ao modelo de privatização, divisão e mecanismos de mercado para evitar a tragédia dos bens comuns. Para além deste erro de base, esta análise dominante, tem igualmente ocultado o facto de existirem bens sobre os quais não é possível realizar nenhum tipo de divisão, nem mesmo abstrata, nomeadamente à escala global, onde a tragédia dos bens comuns globais é o sinónimo da Suprema Tragédia.

Nesta escala, para além da abordagem global ao bem, o qual se tornou possível definir a partir do momento em que foi identificado o *Safe Operating Space of Humankind*, é também necessário definir a comunidade de interesses na manutenção do bem comum, neste caso o estado favorável do Sistema Terrestre. A construção de um modelo de gestão do uso organizado do Sistema Terrestre pressupõe a existência de uma comunidade humana (o conjunto planetário da Humanidade) internamente organizada, com o objetivo de agir como protetora do Sistema Terrestre.

Como seres humanos, vivemos simultaneamente em dois tipos diferentes de comunidades de interesses: uma ao nível das sociedades nacionais e outra ao nível da comunidade global. Mas, ao contrário das comunidades nacionais organizadas em territórios, a comunidade global da humanidade não é sujeito de Direito Internacional, uma vez que não tem território onde basear uma "existência" organizada como uma verdadeira comunidade de interesses comuns. O principio da territorialidade condiciona de forma transversal todas as construções sociais humanas e nesta matéria o ponto de partida a partir do qual a análise tradicional é feita é que uma comunidade humana organizada pressupõe necessariamente a conjugação do elemento território com o elemento povo, como suporte originário de onde deriva e delimita da autoridade do poder político.

Acontece que à escala da comunidade humana global o "território" da humanidade é o planeta, e esse facto ultrapassa o conceito de autoridade e organização exclusivamente fundada num elemento territorial. A humanidade não possui desta forma um *substrato de lugar* do qual derivam consequências jurídicas, e a partir do qual se possa basear a organização de comunidade de interesses comuns de longo prazo, distintos e complementares dos interesses de curto-prazo do Estados. O próprio Património da Humanidade é em si uma ficção jurídica imprecisa, uma vez que a humanidade não pode

ser verdadeiramente titular de quaisquer direitos, nem sequer de representação, uma vez que não possui qualquer personalidade jurídica (nacional ou internacional). Estes problemas são visíveis, por exemplo, na gestão internacionalizada dos fundos Marinhos - a chamada Área – prevista pela Convenção das Nações Unidas sobre Direito do Mar (CNUDM e também conhecida por Convenção de Montego Bay), onde no seu artigo artigos 136º, se afirma "A Área e seus recursos são Património Comum da Humanidade." Este património comum é constituído pelos territórios dos fundos marinhos remanescentes das jurisdições marítimas dos estados costeiros, isto é, todas as áreas que ficam para além dos limites das zonas económicas exclusivas. A discussão doutrinal sobre esta questão é em si reveladora da fragilidade do conceito jurídico de Humanidade e da própria ficção jurídica que o próprio Património da Humanidade constitui. A humanidade como conceito biológico não encaixa no modelo dogmático-formal da organização territorial.

Embora para alguns autores, como Sadok Belaid (1982:433-39), a qualificação da Área como Património Comum da Humanidade traduza o reconhecimento da comunidade humana ou mesmo da humanidade como titular de um direito de propriedade coletivo, a grande maioria contraria veementemente esta opinião. Este posicionamento fundamenta-se com argumentos que recaem no facto da comunidade humana ou a humanidade não serem sujeitos de direito, isto é, não só a humanidade não possui personalidade jurídica, sendo desta forma insuscetível de ser titular de quaisquer direitos, como no facto da própria ideia de um direito de propriedade coletiva não parecer adequada à caracterização do Património Comum da Humanidade. Em bom rigor, a circunstância dos artigos 136º e 137º aparentemente atribuírem à humanidade a titularidade de certos direitos, não parece suficiente para concluir a personalidade internacional da humanidade e a inerente titularidade das referidas posições jurídicas. Se para alguns a inexistência de normas na CNUDM sobre a questão da personalidade da Humanidade só pode significar a sua não personificação internacional e a inerente insusceptibilidade de possuir a titularidade de quaisquer direitos face à Área, para outros, o que releva é a prática da própria Autoridade que age em nome e no interesse da Humanidade, não sendo necessário para tal uma menção formal expressa de que a personalidade lhe tenha sido atribuída.

A consideração da Área como Património Comum da Humanidade só pode ser explicada através de uma verdadeira ficção jurídica. Na realidade, não é a Humanidade que surge como sujeito de direito internacional, mas sim a Autoridade Internacional dos

Fundos Marinhos. Consequentemente, só esta pode ser titular de direitos e estar adstrita a obrigações, ainda que ficcionadamente se diga agir como representante da Humanidade.

Uma certeza, porém, existe: o território submerso que está sob o regime jurídico de Património Comum da Humanidade funciona como substrato territorial de um sujeito de direito internacional (A Autoridade) pelo que esta se assume como titular de um verdadeiro domínio público sobre o referido espaço. Todavia, a titularidade do citado espaço confere à Autoridade, simultaneamente, o ónus de gerir e explorar os recursos da Área em benefício de toda a Humanidade, tendo sempre em vista a sua conservação para as gerações futuras (Fialho et.al 2009:10).

Por outro lado, a Humanidade é recorrentemente mencionada nos textos dos Tratados Internacionais, sem, no entanto, ser clara a forma da sua representação, existência ou aptidão para se constituir como titular de direitos. Ora se existe algum comentário que possa ser feito quanto à questão da Humanidade é que a própria problemática em si é reveladora do paradigma da territorialidade como ponto focal a partir do qual se analisam todos os factos do mundo real.

Isto é, embora o conjunto humanidade exista de facto, não pode ser titular de direitos, mas, no entanto, pode nomear representantes para os exercer através dos Estados... uma vez que na "(...) impossibilidade de ser atribuída a representação da Humanidade diretamente aos Estados, com a consequente criação de uma entidade internacional, por meio da qual os Estados organizam e controlam as atividades da Área. (Fialho et.al 2009:11)".

Perceber o contexto legal existente é então fundamental para perceber a estrutura da atual relação Humanidade-Planeta/Sistema Terrestre e as causas estruturais que estão na base do modelo "não-adaptado" vigente, bem como na inexistência da uma comunidade global organizada com o *willing to act,* conforme mencionado por Gautam, para ser possível a construção de uma ação coletiva. Este contexto será ainda um fator determinante para o problema do enquadramento jurídico das gerações futuras e os seus potenciais interesses.

1.6. Uma Ecologia Humana trans-temporal

Outra dimensão a ter em conta na análise da relação entre a comunidade humana e o /Sistema Terrestre, será perceber de que forma a organização desta comunidade está adaptada, ou não, para acautelar os interesses das gerações futuras. A encruzilhada de desafios que se colocam à Ecologia Humana na sua afirmação como ciência integradora, estendem-se muito além do desafio científico de construção de uma plataforma de conhecimento que integra várias disciplinas. Se anteriormente analisamos o desafio da escala do objeto, no sentido de que é inevitável abordar o Sistema Terrestre na sua globalidade, e um outro desafio relativo ao sujeito, no sentido de abordar a Humanidade como o conjunto de todos os seres humanos, relativamente a este último teremos ainda que nos debruçar sobre o desafio temporal, no sentido de perceber em que medida o modelo de adaptação pode ou não assegurar um suporte de vida para a continuidade das gerações que ainda não nasceram.

Uma vez que os impactos realizados no estado do Sistema Terrestre são cumulativos e a relação entre causas e efeitos implicam necessariamente uma projeção de vínculos para o futuro, abre-se uma série de possibilidades distintas de abordagens: a) sob uma ótica crítica estritamente jurídica, as relações com as futuras gerações podem ser consideradas impossíveis, na medida em que estas ainda não existem, b) sob uma análise económica, podem ainda ser desinteressantes, no sentido de nada poderem retribuir aos interesses materiais das atuais gerações, c) podem ainda ser considerados apenas deveres meramente morais. Finalmente, também é possível identificar uma obrigação de solidariedade com as gerações futuras e que ultrapassa a noção egoísta e utilitarista das gerações atuais.

Para Edith Weiss (1992:5) "There are two relationships that must shape any theory of intergenerational equity in the context of our natural environment: our relationship to other generations of our own species and our relationship to the natural system of which we are a part. The human species is integrally linked with other parts of the natural system; we affect and are affected by what happens in the system. We alone among all living creatures have the capacity to shape significantly our relationship to the environment." Esta visão pode ainda ser sustentada no regime legal de Património Comum da Humanidade, como explica Alexandra Aragão (1997:31): "Da ideia de Património Comum da Humanidade, podem-se retirar duas consequências: primeiro, que sobre estes recursos existe uma espécie de comunhão, uma sobreposição e um paralelismo

de direitos absolutos, cuja finalidade é a satisfação tanto de interesses coletivos como individuais; segundo, que as gerações atuais os detêm apenas a título fiduciário. A responsabilidade fiduciária das gerações presentes perante as futuras significa que os recursos devem ser deixados às futuras gerações, tal como foram encontrados, preservando tanto a variedade como a abundância como ainda a qualidade dos bens".

Este dever é expresso na teoria da "equidade intergeracional": "The second fundamental relationship is that between different generations of the human species. All generations are inherently linked to other generations, past and future, in using the common patrimony of Earth. The theory of intergenerational equity stipulates that all generations have an equal place in relation to the natural system. There is no basis for preferring the present generation over future generations in their use of the planet (Weiss 1992:6)".

Apesar deste princípio da equidade intergeracional se encontrar já previsto em algumas Constituições, como é o caso da Constituição Brasileira[3] onde as gerações futuras não são tidas apenas como interessadas, mas antes consideradas verdadeiros titulares de direitos em relação ao desenvolvimento e ao património ambiental, esta "responsabilidade de longa-duração" levanta várias dificuldades teorético-dogmáticas e jurídico-dogmáticas no recorte de um sujeito de direitos e de relações jurídicas, nebulosamente identificado como "gerações futuras", conforme alerta Gomes Canotilho (2003). Estas dificuldades levam alguns autores a acentuar que o que está em causa não será a titularidade de direitos futuros, mas sim a inclusão dos *interesses das gerações futuras* nos princípios materiais de atuação político-constitucionalmente relevantes. Outra corrente da doutrina refere-se a este direito na esteira de reconhecer um *direito ao futuro,* ou seja, a uma obrigação jurídica de proteção do futuro (Ayala 2004, Freitas, 2012).

Numa lógica estritamente formal será difícil recortar uma relação jurídica com o futuro, no sentido de ser impossível definir com precisão o sujeito dessa relação futura. É com base nesta lógica de raciocínio que Wilfred Beckerman (2006) nega a existência de direitos ou interesses das futuras gerações, baseando-se em três silogismos: (1) às futuras gerações – de pessoas ainda não nascidas – não se pode reconhecer quaisquer direitos; (2) qualquer teoria de justiça coerente implica uma atribuição de direitos às

[3] Constituição da República Federativa do Brasil – Artigo 225º "Todos têm direito ao meio ambiente ecologicamente equilibrado, bem de uso comum do povo e essencial à sadia qualidade de vida, impondo-se ao Poder Público e à coletividade o dever de defendê-lo e preservá-lo para as presentes e futuras gerações." - Centro de Documentação e informação, Edições Câmara, Brasília, 2012.

pessoas. Portanto, (3) os interesses das futuras gerações não podem ser protegidos ou promovidos sob a estrutura de qualquer teoria de justiça.

Desta questão, em virtude da limitação imposta pelo princípio da representação democrática (quem decide é a atual geração) e de que a responsabilidade dos governantes que tomam decisões hoje é limitada ao tempo das suas vidas, Carla Amado Gomes (2007) defende que a solidariedade entre gerações se trata de um imperativo meramente moral, que impende sobre a geração que tem na sua disponibilidade a história, e por isso assume responsabilidades perante os vindouros — mas esta obrigação não têm um carácter jurídico. Em conclusão Amado Gomes define (2007:108) "a teoria da solidariedade intergeracional, apesar de "emotivamente sugestiva" e "nobre nas suas intenções", não consegue ultrapassar o limiar da obrigação moral, em virtude dos obstáculos práticos [ausência de representatividade política (dos interesses) das gerações futuras], jurídicos (inexistência de mecanismos de imputação de responsabilidade das gerações futuras relativamente às anteriores), científicos (impossibilidade de atestar, com absoluta certeza, a inocuidade e irreversibilidade de certas intervenções ambientais), sociais (dificuldades: - de travar a introdução de inovações tecnológicas que constituem uma melhoria aos olhos da geração presente; - de explicar a necessidade de alteração ou mesmo eliminação de hábitos presentes em nome de hipotéticos interesses das gerações futuras) que reveste."

São estas dificuldades que levaram John Rawls (2008) a afirmar que nós podemos fazer algo para a posteridade, mas ela nada pode fazer por nós. Esta situação é inalterável, e por isso a questão da justiça não vem à tona. E é por esta razão que o problema da justiça intergeracional coloca à teoria da ética severos senão impossíveis testes.

Antonio Benjamin (2011) alerta ainda para o facto de as futuras gerações não poderem estar fisicamente presentes nos debates legislativos do presente, bem como os milhões de espécies existentes no planeta, muitas das quais nem sequer são conhecidas pela Ciência. No entanto, mesmo reconhecendo a verdade destes factos, também não podemos negar a certeza de que as gerações futuras possuirão existência em determinado momento histórico, a não ser que a vida neste planeta fosse extinta de uma única vez, situação na qual não restaria oportunidade para alguém beneficiar da herança cultural ou dos recursos planetários. Como essa possibilidade não se coloca para já, há que ultrapassar o paradoxo, como afirma (Weiss 1992:14): "This paradox assumes the traditional conceptual framework of rights as rights of identifiable individuals. But planetary intergenerational rights are not in the first instance rights possessed by individuals. They are, instead,

generational rights, which must be conceived of in the temporal context of generations. Generations hold these rights as groups in relation to other generations - past, present, and future. This is consistent with other approaches to rights, including the Islamic approach, which treats human rights not only as individual rights, but as "rights of the community of believers as a whole." They can be evaluated by objective criteria and indices applied to the planet from one generation to the next. To evaluate whether the interests represented in planetary rights are being adequately protected does not depend upon knowing the number of kinds of individuals that may ultimately exist in any given future generation."

Este raciocínio parte de um pressuposto fundamental, o de se reconhecer senão a existência das gerações futuras, a certeza de que possuirão existência em determinado momento histórico. Seja esse facto visto como mera expectativa, seja como futuro naturalmente previsível. Helena Melo (2002:156), entende que vários sentidos têm sido atribuídos à expressão gerações futuras, quer abrangendo as crianças já nascidas, quer abrangendo apenas os indivíduos, quer abrangendo apenas os indivíduos que nascerão num futuro mais ou menos remoto. Se partirmos do conceito de geração como "o conjunto dos indivíduos nascidos mais ou mesmo tempo (Malhotra 1998:41), cobrindo cada geração um período de aproximadamente vinte e cinco anos, tal significa que nesta abordagem não existe uma clara demarcação entre uma geração e a geração imediatamente a seguir ou anterior. Há, antes pelo contrário, um *continuum* de gerações, que se sucedem e sobrepõem no tempo. Ainda segundo Malhotra (1998:41) "De acordo com esta aceção, os indivíduos futuros são indivíduos que ainda não existem, sendo impossível determinar com exatidão quem e quantos serão. Juridicamente são concepturos, i.e., nascituros ainda não concebidos cujo o nascimento futuro se prevê como possível".

As gerações futuras serão assim constituídas pelos indivíduos que existirão num determinado período da história da Humanidade, pelos indivíduos humanos futuros. Giuliano Pontara (1996:112), entende que "indivíduos futuros" serão "todos aqueles indivíduos que relativamente aos indivíduos existentes num determinado período de tempo *t,* existirão de facto depois de *t*." Estes indivíduos farão parte da "coletividade *ad infinitum* de todos os seres humanos que sucederão à presente geração que se encontra viva" num determinado momento da história. Cada geração será deste modo "um elo numa cadeia sem fim de gerações que coletivamente forma uma comunidade, a Família da Humanidade" (Agius 1998:7).

Aparece deste modo, o conceito de Humanidade como uma comunidade intergeracional, que inclui as gerações passadas, presentes e futuras, como uma "comunidade de seres que olham para trás e para a frente, que interpreta o passado à luz do presente, que vê o futuro como nascido do passado" (Agiu, Kim 1998:15). Se o Direito ainda busca um caminho que torne possível enquadrar juridicamente uma comunidade que existe no interior de todas as fronteiras e é global, as ciências naturais já encontraram o fundamento da unidade biológica da existência real e factual desta comunidade global: "toda a pessoa, quer viva hoje ou no futuro, se encontra relacionada genética e culturalmente com o resto da comunidade da raça humana" (Santos 2001:68). A Humanidade pode assim significar a "totalidade do género humano, o conjunto de todos os seres humanos que habitam o planeta" (Santos 2001:68) ao longo das sucessivas gerações. É também chegada a hora de fazer coincidir estas realidades naturais com a realidade construída, que reconhecendo igualmente a factualidade da existência de povos politicamente organizados num determinado território juridicamente delimitado, não impliquem necessariamente a ocultação e negação da existência de uma comunidade humana global geneticamente e temporalmente ligada.

Mas apesar do contributo positivo na definição de Humanidade suscitada pela evolução das ciências da vida e pela descodificação do genoma humano, os problemas do recorte de um sujeito de direitos e de relações jurídicas futuras, mantêm-se. E é exatamente ao fugir de conceitos metafísicos, que John Ralws (2008), conforme já visto, retoma a discussão do futuro num verdadeiro marco teórico sobre a responsabilidade intergeracional. Trata-se de uma teoria que busca o descolamento de qualquer vínculo jurídico com o futuro de uma visão metafísica sobre o mesmo, apoiando-se na noção de interesses enquanto fatores decisivos para a ação, e a racionalidade como critério de justiça. Parte-se assim de um pressuposto temporal elementar, qual seja, o de centrar o foco no presente e no raio de ação das gerações vivas, ainda que para gerar efeitos para as futuras gerações. Na verdade, como refere Fensterseifer, (2014) as gerações futuras nada podem fazer hoje para preservar o ambiente de que vão usufruir, razão pela qual toda a responsabilidade (e deveres correspondentes) de preservação da vida e da qualidade ambiental para o futuro recai sobre as gerações presentes.

É neste contexto, com base no princípio da solidariedade intergeracional, em que as responsabilidades das gerações humanas presentes respondem perante um critério de justiça intergeracional, ou seja, entre gerações humanas distintas, que iremos procurar

encontrar um espaço em que a Ecologia Humana possa servir como uma plataforma de soluções.

1.7. Ecologia Humana – Uma ciência do Antropoceno como construtora de sínteses e soluções

O último período interglacial relativo aos últimos 11.700 anos, corresponde a um período de estabilidade climática sem qualquer precedente na história do Sistema Terrestre. É o chamado período geológico do Holoceno. As alterações que as atividades humanas estão a provocar na estrutura biogeofísica do Sistema Terreste correspondente a este período, são de tal forma impactantes, que estamos a provocar uma alteração nestas condições favoráveis e a dar origem a uma nova era geológica - o chamado "Antropoceno"- após o Holoceno. Entre os fatores decisivos estão o grande aumento na população humana, produção de metano pelo gado, pesca, o uso de água, alterações no uso da terra, a queima de combustíveis fósseis e as emissões de CO2, os plásticos e os fertilizantes à base de azoto, estão entre as atividades humanas que contribuem para, entre outras coisas, as alterações climáticas, a acidificação dos oceanos e a extinção de grande número de espécies, a chamada sexta extinção. A totalidade dessas atividades humanas contribuíram para o advento do Antropoceno e são já rastreáveis nos estratos geológicos da Terra.

Os motivos que estão na origem da rutura das condições favoráveis e da consequente mudança para uma nova época geológica estão profundamente enraizados num direito internacional completamente inadaptado para lidar com a dimensão global dos bens comuns. As causas estruturais desta disfuncionalidade jurídica são, em nosso entender, essencialmente duas: a) manutenção de uma abordagem estritamente territorialista, em que os bens comuns globais são apenas os territórios sobrantes das divisões políticas entre os Estados, b) manutenção de um direito económico internacional que considera como "externalidades" (positivas ou negativas) as alterações provocadas nos ciclos biogeofísicos globais. De referir, que embora numa primeira análise estas causas aparentem uma ausência de relação, a consideração destes fatores vitais como "externalidades" encontra a sua razão de ser na abordagem territorialista: porque estes elementos não-territoriais só podem ser considerados "externos" ao território dos Estados,

estes ciclos biogeofísicos são juridicamente irrelevantes e, como resultado desta irrelevância são também economicamente invisíveis.

Os resultados desta inadaptação são uma inexorável caminhada para a tragédia dos ciclos biogeofísicos globais, que por sua vez irão dar origem à tragédia dos territórios, da organização social e das fundações da vida - a Tragédia Suprema. A consideração de que os fatores que afetam os ciclos biogeofísicos globais são "externalidades" relativamente aos Estados, e de que tudo o que é global ou trans-temporal, ou é invisível ou tecnicamente impossível, são os bloqueios dogmáticos que impedem a mudança estrutural como única possibilidade de encontrar um conceito que nos permita uma solução.

Para ultrapassar este bloqueio, para gerir estes desafios de evolução e mudança, precisamos de maneiras efetivas de tomar decisões coletivas e de longo prazo que tenham em consideração a sobreposição destes ciclos biogeofísicos que existem no interior e exterior de todos os Estados, e os interesses de todos os afetados incluindo os interesses das futuras gerações. O sistema implementado para gerir estas questões globais - incluindo a ONU e as organizações conectadas com as Nações Unidas - está, na sua forma atual, refém do sistema estado-cêntrico, sem uma definição e delimitação clara dessa tarefa comum de assegurar a manutenção do Sistema Terrestre como um todo, de forma autónoma e complementar aos interesses individuais dos Estados. Hoje, estes desafios da interdependência são respondidos com o recurso a ferramentas de ontem - negociações multilaterais que são suscetíveis a interesses nacionais de curto prazo. Como consequência, as ações necessárias não são tomadas ou são tomadas muito tarde, enquanto os problemas e os riscos continuam a crescer.

Como Afirma Anthony Giddens (1999:18), "Estamos a ser empurrados para uma ordem global, que devido à sua escala e total interdependência, nem sequer a conseguimos compreender ou explicar, mas cujos os efeitos se fazem já sentir. Mas ninguém que pretenda progredir neste final de século pode ignorar esta realidade (...). O Século XXI será o campo de batalha em que o fundamentalismo se vai defrontar com a tolerância cosmopolita." Esta nova ordem global, é ainda uma desordem. Ainda não é conduzida por uma vontade humana coletiva, mas antes emerge de forma anárquica, ao acaso, movida por uma mistura de influências. Nesta desordem florescem os nacionalismos, os populismos locais como resposta às tendências globalizantes desreguladas, e que tornam os velhos Estados-Nação mais fracos, na ilusão de que se afirmarem a sua independência fechando as fronteiras, se tornam mais fortes. A

possibilidade de sairmos deste ciclo fatal compete em primeiro lugar ao direito, na sua dimensão de estrutura organizadora e harmonizadora destas tensões e não no seu papel sancionatório. Ainda na esteira de Giddens (1999:24), "Assim, há que admitir que a globalização não é um processo simples, é uma rede complexa de processos. E estes operam de forma contraditória ou em oposição aberta. Para a maioria das pessoas, a globalização é apenas uma "troca" de poder ou de influência, das comunidades locais ou das nações para a arena global. (...) Precisamos de reconstruir as instituições que temos, ou substituir por outras. Porque a globalização não é um incidente passageiro nas nossas vidas. É uma mudança das próprias circunstâncias em que vivemos. Para superar esses desafios, teremos que repensar a natureza fragmentada do sistema jurídico internacional". Neste sentido a organização destes interesses comuns necessita de uma autonomização que permita a sua gestão permanente por uma entidade independente que aja em nome e no interesse de todos, e onde todos estejam devidamente representados.

No contexto das relações dominantes entre Estados, ainda é visível que em alguns dos mecanismos comerciais que fazem parte dos acordos ambientais multilaterais (MEAs), demonstram igualmente que o quadro subjacente das relações está ainda intimamente ligado ao legado colonial do direito internacional. Com o advento da interdependência e do Antropoceno, sabemos hoje que a exportação de problemas ambientais do "núcleo" para a "periferia", dos estados desenvolvidos para os países em desenvolvimento, não é apenas moralmente censurável, como conduz ao mesmo resultado. Por outras palavras, perceber o Antropoceno é interiorizar a globalidade, a interdependência e ser capaz de pensar sem fronteiras, percebendo que a origem ou localização da atividade humana danosa serve apenas como informação para a construção de um sistema de organização da justiça interna, mas que é irrelevante na escala global.

Esta impossibilidade de "exportar" atividades que provocam danos ou de armazenar benefícios, suscitadas pelas interconexões ecológicas e que resultam em interdependências políticas e económicas, são os sinais exteriores de algo que nunca existiu antes: uma sociedade cosmopolita global. Somos a primeira geração a viver numa sociedade, cujos contornos ainda mal conseguimos vislumbrar, e para qual não existe ainda um sistema de organização nem à escala da comunidade humana, nem à escala do funcionamento global do Sistema Terrestre.

Como se afirma no relatório Global Commons in the Anthropocene, *"The Anthropocene is the defining concept of our age. The most significant implication for life in the Anthropocene is the urgent need to shift to a new worldview that encompasses the*

idea of planetary stewardship for the Global Commons, thereby delivering global benefits. Effective planetary stewardship can be defined as the sum total of societal and individual activities that generate long-lasting prosperity for all and enhance the resilience of the Earth system. To achieve this aim will require a shift in worldviews at all scales, from local community to nation and from regional to global" (Nakicenovic,N. et.al 2016,32-33).

A nova era do Antropoceno significa uma nova visão do mundo, onde o pensamento em silos desaparece, onde o pensamento global enquadra e orienta as ações locais, onde as fronteiras são encaradas apenas como um nível necessário da organização social que não é confundível com a realidade global ambiental, onde os fenómenos ambientais e os fenómenos sociais se percecionam como interdependentes, encaixa com missão da Ecologia Humana como ciência que, pela sua especificidade, pode dar um contributo relevante para essa nova forma de olhar o mundo (Pires 2014). O seu grande objetivo pretende ser uma contribuição para a construção de uma visão antri-fragmentária do mundo unindo e dando sentido à contribuição das ciências especializadas (Steiner e Narkus, 2003), procurando conexões entre os saberes que de outra forma ficariam segregados (Borden, 2014).

Só partindo de uma visão global, onde o contacto e interação entre as ciências naturais e as ciências sociais é fundamental, é possível construir uma mediação entre as capacidades da técnica, o Sistema Terrestre, as nossas intenções e as organizações que as sustentam.

Capítulo 2

A Natureza Intangível

"Nunca conseguiremos ser donos da nossa própria história, mas é obrigatório que encontremos os meios, e temos capacidade para isso, de colocar este nosso mundo "desvairado" no rumo certo. (Giddens 1999 p.18)

2.1. O Património Intangível como o fio de Ariadne do Antropoceno

Como explicado anteriormente, a utilização da "territorial obsession" (Taylor 2016:112) como modelo exclusivo da organização social, é uma narrativa manifestamente incompleta e limitadora não só no contexto da complexidade ambiental existente, bem como na diversidade das sociedades de hoje. Este modelo territorialista que oculta tudo que interliga, interfere e é global, tem tido como resultado a abertura de um espaço de livre arbítrio, que marginaliza a própria autoridade do Estado. Isto acontece nos mais variados níveis, exigindo uma evolução para uma *multi-level governance*, que vai muito além da governança espacial do território. Neste contexto, a par com a questão ambiental, a área que mais se tem destacado pela sua influência e pelo seu poder efetivo, é o da globalização financeira. Woodward (2005:46), no seu artigo "*territorial trap*" afirma: "Therefore spaces of places models alone are not sound basis for the development

of a generalizable framework of multi-level governance. Space of places models need to be complemented by an analysis of non-state spheres of authority understood as "spaces of flows" (Choen1998). The spaces of flows perspective recognizes that some spheres of authority are deterritorialized meaning that they derive their power and authority from, and exercise their power and authority over, functional or social as opposed territorial spaces. The strength of this approach is its appreciation of sites and structures of governance that cut across, exist within and cascade through territorial levels. The problem is that the spaces of flows blueprint ignores or marginalizes structures of power and authority grounded in territorial space, so, like space of places model, it represents an incomplete narrative on contemporary financial governance. Cohen's (1998) solution to this dilemma is to introduce a fresh concept, "the authoritative domains", that recognizes, reconciles and synthesizes territorial and non-territorial elements of power and authority's territorial and non-territorial elements of power and authority into a single overarching governance condominium."

A nível ambiental a ocultação social das conexões globais e a inexistência de uma governação efetiva dos elementos não-territoriais constituídos pelos ciclos biogeofísicos globais (para os quais as atuais tentativas de governação multilateral, têm sido manifestamente insuficientes) exigem igualmente uma governação não-territorial.

Neste sentido, a governação do Antropoceno requer esta abordagem multi-escala, onde a governação dos interesses globais e comuns a toda a humanidade, presente e futura, coexiste com a governação territorial. E não deixa ser interessante o facto de o modelo proposto para uma governação financeira da globalização ser o condomínio, como o único modelo jurídico capaz de comportar uma governação multi-level. Estas soluções de coexistência apontam para o facto de que o que está em causa não é o "fim-do-Estado" territorial, mas sim, a sua inevitável evolução. O principal obstáculo a ultrapassar é precisamente o atual modelo da "obsessão territorial" como solução única de governação. Se partirmos da inevitável factualidade do funcionamento global do Sistema Terrestre para a procura de soluções, percebemos que o reenquadramento destas barreiras conceptuais jurídicas é possível, e essa é uma condição prévia estrutural para a construção de um modelo de organização social adaptado ao funcionamento planeta – isto é, é um passo primordial para realização do próprio objetivo da Ecologia Humana.

A Ecologia Humana, ao colocar a comunidade humana no seio do ecossistema global – o Sistema Terrestre – está a confrontar-se com uma série de paradigmas sociais consolidados ao longo da história da humanidade. A sua visão holística é em primeiro

lugar altamente desafiante para o sistema jurídico, como esquema regulador das relações entre indivíduos, Estados e comunidades. Neste sentido, a ecologia humana na sua função de síntese dialogante, deverá ter como parceiros estratégicos as ciências do Sistema Terrestre e as ciências jurídicas, os quais vão ser essenciais para realizar o trabalho de enquadramento teórico prévio, na construção de uma sociedade adaptada ao funcionamento do Sistema Terrestre.

2.2. Organizar a fruição coletiva

Embora recente na escala temporal das ciências jurídicas, o direito do ambiente, pela sua capacidade de intervir em todas as áreas do agir humano, desde cedo, quer no processo da sua conceptualização, quer no processo da sua aplicação, revelou-se subversivo e complexo. O carácter difuso e indeterminado do seu objeto, a impossibilidade de o conter no interior de uma fronteira administrativa ou política, levantou problemas de harmonização com os restantes ordenamentos jurídicos internos ou internacionais, sobrepondo as dimensões locais e globais com as estruturas jurídico-dogmáticas estabelecidas.

Este desajustamento entre o novo direito e o direito pré-existente deve-se em grande medida a esta sobreposição de diferentes tipos de relações humanas em diferentes escalas, em que algumas das quais podem ser em parte enquadradas no nível local do Estado, mas cujos os efeitos são em grande parte dispersos numa escala global. Isto é, enquanto a dimensão do micro-bem ambiental gera relações típicas do Direito Público ou do Direito Privado nos termos tradicionais para o Direito, a dimensão do macro-bem ambiental – o Sistema Terrestre – deveria gerar um novo tipo de relação jurídica, de natureza global, e para a qual não existe um suporte legal nem *locus* que lhe possa conferir um enquadramento jurídico.

Esta incompatibilidade sistémica entre funcionamento do Sistema Terrestre e modelo de divisão territorial existente, não se ficou apenas ao nível do espaço geográfico. Aprofundando a disfuncionalidade entre modelos, a crise ambiental questiona ainda não só o modelo económico quanto ao objetivo do crescimento ilimitado, como ainda levanta a questão da absoluta da necessidade de desenvolver um modelo de prossecução de interesses comuns. Ora estas características são altamente desafiadoras para o modelo económico existente, onde a solução para a harmonização entre interesses coletivos e

interesses privados nos é apresentada através da consideração de que a soma da prossecução dos interesses individuais representará a melhor forma da prossecução dos interesses comuns. É neste contexto que o "bem ambiente" surge, e que sendo um bem global indivisível e inapropriável (embora o seu estado possa ser alterado pelo uso), não se presta a uma fruição de troca e alienação, mas sim a uma função de fruição coletiva (Colaço Antunes 1998). Isto é, a tarefa de organizar a fruição do ambiente, neste caso o macro-bem Sistema Terrestre, não pode ser realizada numa lógica de divisão, propriedade privada e mecanismos de mercado desregulados.

Ora, conscientes desta impossibilidade na escala do Sistema Terrestre, um dos desafios mais importantes do Antropoceno será o de anular a antítese existente entre os dois nos modelos de governança de bens comuns: a solução clássica de Garret Hardin – divisão, direitos de propriedade e mecanismos de mercado para evitar a "Tragédia dos Comuns" - e a abordagem de Elinor Ostrom que estabelece as condições estruturais necessárias para que gestão coletiva seja possível, resultando em vantagens mútuas para todas os participantes no médio prazo.

À escala de nosso verdadeiro *Global Common* - o Sistema da Terrestre – a utilização isolada de uma destas soluções, não é capaz de retratar com precisão todos os factos:

a) As fronteiras políticas das soberanias constituem o suporte estrutural da organização social. Neste nível, a solução de divisão de Hardin, parece permanecer válida sem nenhuma alternativa visível.

Mas por outro lado…

b) O estado favorável do Sistema Terrestre é um bem intangível global, no qual não é possível realizar nenhuma operação de divisão, nem mesmo abstrata. Neste contexto, os princípios identificados por Ostrom para a gestão bem-sucedida dos bens comuns, podem vir a ser um contributo de excecional relevância para a construção de um modelo capaz de assegurar a preservação do estado favorável como uma herança que deve ser mantida para usufruto das próximas gerações.

Então o desafio que se coloca ao Direito é em grande medida o da construção das condições estruturais necessárias para tornar possível esta fruição coletiva de um bem que não é suscetível de apropriação ou divisão, e ao mesmo tempo assegurar a manutenção

da divisão política territorial. Só depois desta organização estar realizada, à escala do bem em causa - o Sistema Terrestre – será possível que o direito do ambiente se torna efetivo – isto é que abandone o seu deficit sistémico de aplicação. Esta desvinculação da vertente proprietarista individual, e a assunção da inevitabilidade da abordagem do ambiente como "bem comum", insuscetível de divisão ou de qualquer forma de apropriação individual, irá constituir o grande desafio da construção de um modelo social para o Antropoceno. Para Amado Gomes (2005:24), "O ambiente é um bem de uma comunidade e a sua dimensão coletiva não pode ser perdida de vista. O direito subjetivo indicia uma posição egoística, longe da perspetiva solidarista que deve presidir à gestão dos bens ambientais. Por isso consideramos que a melhor doutrina é aquela que vê no direito ao ambiente um *direito-dever de utilização racional dos bens ambientais.*(...) O direito ao ambiente, constitui desta feita, um bom exemplo de um novo tipo de direitos fundamentais, verdadeiros "direitos de solidariedade", "direitos poligonais" ou "direitos circulares" cujo conteúdo é definido pelo interesse comum,(...)". Ora esta organização implica uma análise das relações cruzadas e não raras vezes opostas, que se exercem sobre este bem de fruição coletiva à escala da comunidade humana global. A identificação das dinâmicas humanas de usos com efeitos negativos e a identificação das dinâmicas naturais que realizam benefícios na manutenção do sistema comum, são uma tarefa base para perceber os conteúdos destas relações e para poder organizar esta fruição.

Uma vez que é de todo impossível fazer coincidir a escala do bem "ambiente" com os limites dos territórios soberanos dos estados, e que o problema da definição do objeto do direito do ambiente pode ser ultrapassado através da definição do *Safe Operating Space*, existem neste momento as condições necessárias para se dar o salto conceptual na definição desse "ambiente salubre" como um novo bem jurídico, que só pode ser assegurado à escala do Sistema Terrestre. Por consequência, ao ser necessário ampliarmos a escala do bem, também a escala da comunidade tem de ser ampliada à totalidade de sujeitos que partilham o uso do mesmo sistema, formando desta forma uma verdadeira comunidade de interesses comuns. Como consequência da impossibilidade de divisão do bem ambiente, o papel da Ecologia Humana como ponte entre as ciências naturais e o direito, será o de estudar e propor soluções de auto-organização, no sentido de harmonizar as interdependências humanas globais que se estabelecem pela mútua dependência relativamente ao uso de um mesmo Sistema Comum.

2.3. Um sistema jurídico baseado numa visão do mundo obsoleta

No contexto de um percurso histórico em que a existência humana chegou a ser formulada como uma realidade exterior e autónoma à natureza e/ou ecossistema global, é natural que as construções sociais sejam também um reflexo da história dessas mundivisões. Por se tratar de um campo do conhecimento autónomo e fundado em princípios e estruturas lógico-formais próprias, as construções jurídicas refletem inevitavelmente o posicionamento ontológico do homem no seio da natureza. A valoração jurídica do meio ambiente possui uma natureza cultural e por isso tende a expressar uma condição ontológica antropocêntrica. "Por outras palavras, o meio ambiente somente foi introduzido como suporte fático e, posteriormente, como fato jurídico em virtude de sua internalização pela cultura humana, ou seja, pela sua representação lógico-formal em normas jurídico-ambientais (Garcia 2016:90)."

A transmutação do "bem ambiente" de suporte fáctico sobre o qual se exercem diferentes formas de apropriação - direitos de soberania, propriedade ou de uso - para a consagração como bem jurídico autónomo com valor *per si,* é o resultado do processo histórico da destruição desse próprio "bem ambiente", que transformou um bem abundante e que se pensava infinito, num bem escasso e limitado cuja deterioração provoca sérios danos às sociedades humanas e ameaça mesmo a sobrevivência da própria espécie. Este será mesmo o motivo que transformou um bem que desde sempre foi juridicamente irrelevante como um "valor" humanamente reconhecido. Como explica Garcia (2016:88) "A relação do Direito com a realidade, ou seja, do mundo das ideias (desdobramento da manifestação cultural e ética humana) com o mundo dos factos, dá-se por meio de vínculos previamente estabelecidos ou admitidos pelas normas. Quando determinado acontecimento é constatado, a ocorrência de efeitos jurídicos dependerá de seu reconhecimento por alguma norma e a correspondente atribuição de consequências jurídicas".

Para chegarmos ao atual nível de juridicidade, o meio ambiente evoluiu da absoluta irrelevância jurídica para a consagração como direito e bem fundamental, tendo invadido

um grande número de textos constitucionais por todo mundo. Com uma variedade alargada de expressões para traduzir este fenómeno natural complexo, a Constituição Portuguesa no seu artigo 66º optou pelo conceito de um "ambiente sadio e ecologicamente equilibrado". Dado o seu carácter sistémico o "bem ambiente" é incompatível com a delimitação territorial dos Estados, deu origem a que as definições deste bem usem recorrentemente conceitos indeterminados e de delimitação imprecisa. Aliás, a dimensão sistémica do bem a proteger foi já percecionada no interior dos próprios Estados, uma vez que essa é uma factualidade inultrapassável: "[...] um Estado constitucional ecológico pressupõe uma conceção integrada ou integrativa do ambiente e, consequentemente, um direito integrado e integrativo do ambiente. [...] o conceito de direito integrado do ambiente [...] aponta para a necessidade de uma proteção global e sistemática que não se reduza à defesa isolada dos componentes ambientais naturais (ar, luz, água, solo vivo e subsolo, flora, fauna) ou dos componentes humanos (paisagem, património cultural e construído, poluição), (Gomes Canotilho, 2010:8)."

O Sistema Terrestre, embora percecionado e vivido diariamente pelos sentidos, foi ao longo da história da humanidade um campo fértil para o inexplicável, para o desenvolvimento de visões místicas ou conceitos indeterminados. Numa total ausência de informação sobre as características do Sistema Terrestre e dos fatores que determinam a seu funcionamento, não se conhecendo sequer a existência de um estado favorável e de limites para a sua manutenção, o resultado inevitável seria a sua invisibilidade social e a sua não consideração como fator essencial à construção de uma organização capaz de proteger as fundações da vida. Não só não se conhecia, como a possibilidade de as atividades humanas poderem estar a provocar uma mudança neste estado favorável eram questões que ultrapassavam os limites hipotéticos do saber e fazer humano. O clima estável e o funcionamento regular dos ciclos da vida eram-nos apresentados como dados pré-adquiridos e imutáveis.

Neste cenário, onde o complexo e inexplicável se confunde com o inexistente, o místico e o sagrado, não era possível reconhecer este estado favorável como um fator da maior relevância, e que pudesse ser definível e internalizado como um valor vital para a vida e organização das sociedades humanaa.

Aceitando a perspetiva do direito como construção humana resultante do processo histórico-cultural da nossa espécie, Mosset Iturraspe (1999:303) define bem jurídico como "bem é tudo o que pode satisfazer uma necessidade. Um bem jurídico é todo bem material ou imaterial – de valor económico ou não – que satisfaz necessidades do

homem".

Tal condição deve-se à exigência, considerada básica e elementar pela teoria geral do direito, de que os factos reconhecidos pelas normas jurídicas possuam relevância para a vida humana. Da mesma forma, aquilo que for considerado inexpressivo ou irrelevante, é igualmente ignorado pelo Direito. Esta tarefa primordial valorativa, coloca o Direito na posição crítica de permanentemente necessitar de se compatibilizar com a evolução do conhecimento, procedendo a uma reinterpretação da realidade tendo em conta as suas várias dimensões e os novos contextos, evitando ficar preso a distorções cognitivas dos seus próprios dogmas. Conscientes da fragilidade de todas as construções humanas e da enorme responsabilidade que cabe às ciências jurídicas nesta tarefa de interpretar e valorar a realidade conhecida, sabemos que a única forma de corresponder a este desafio será de estabelecer um permanente diálogo entre os seus conceitos e o seu *modus operandi*, e a evolução do conhecimento científico e social. Mas nas ciências naturais, como nas ciências da vida, todos os avanços são simultaneamente geradores de liberdade e de novas responsabilidades: "A aplicação técnica das novas ciências da vida (o conjunto das chamadas biotecnologias) alargou, de forma inédita o âmbito do fazer humano; podemos dizer que, pela primeira vez, na história da humanidade, o homem dispõe de um saber que lhe permite exercer poder sobre a natureza, sobre a vida e sobre a morte, isto é, sobre o que antigamente fugia à sua alçada e era considerado fatalidade ou, de um modo determinista, uma sequência puramente casual de acontecimentos.

No entanto, este poder, libertador e gerador de autonomia, tem-se revelado ambíguo e perigoso: desencadeia efeitos extremamente benéficos e simultaneamente ações cujas as consequências perigosas têm uma dimensão cósmica e muitas vezes irreversível. É justamente isto o que nos assusta e inquieta, exigindo-nos pela primeira vez, responsabilidade. De facto, tudo o que nos envolve pode, hoje, pela primeira vez, depender inteiramente de nós. (Silva, 2002.10)"

O estudo recente sobre as consequências das ações humanas sobre o ambiente, trouxe-nos a informação sobre o funcionamento do Sistema Terrestre, e esse "ambiente ecologicamente sadio" abandonou a condição de conceito indeterminado de contornos espaciais e qualitativos incertos, para se traduzir no espaço intangível de segurança bem definido, que não conhece fronteiras. Isto é, hoje conseguimos identificar quais são os elementos que determinam o funcionamento do Sistema Terrestre e de que forma e em que medida ao alterarmos esses fatores, interferimos no funcionamento do sistema do qual somos parte. De facto, hoje, tudo o que nos envolve, desde o próprio genoma da

nossa espécie, ao "código genético" do funcionamento do Sistema Terrestre, tudo pode realmente depender inteiramente de nós. O facto de termos provocado estas alterações aos mecanismos e condições essenciais de suporte da vida, deu-nos acesso a um conhecimento que gerou um enorme poder e uma tremenda responsabilidade à ação humano no seu todo.

Esta possibilidade requer por parte do direito do ambiente uma intervenção que ultrapassa a sua consideração como "ramo de direito", e convoca-o para uma evolução que seja capaz de representar uma nova mundividência em que os elementos não-territoriais que asseguram a condições biogeofísicas da vida, estejam no centro em torno do quais se regulam as relações que se realizam entre todos os seres humanos, numa escala global.

Ora, como afirma Garcia (2016:89), "A primeira questão a ser enfrentada pelo Direito Ambiental é o de identificar seu objeto principal ou centro de tutela. Em que pese ser possível apresentar a resposta "meio ambiente" de maneira rápida e lógica, o que se busca, verdadeiramente responder é de qual meio ambiente se está efetivamente tratando." Por muito que o bem em causa não se confine às divisões político-administrativas, o carácter global, indivisível e interdependente do estado funcional favorável do Sistema Terrestre é uma factualidade inultrapassável. Constituindo as fundações da vida como a conhecemos até hoje, o seu valor é obviamente vital, inquestionável e incontroverso. É o meta-valor, que assegura e suporta as condições de vida na Terra, e da própria espécie humana. Neste sentido, como refere o Acórdão de 02/07/1996 Proc. Nª. 483/96 do Supremo Tribunal de Justiça: **"**Repare-se neste pormenor tão simples quanto incontroverso: ***se as condições reais levarem à desarticulação dos meios ambientais que permitam, efetivamente viver, o direito à vida não passará de uma abstração teórica de curto prazo.*** (…)." Ao não abarcar o "bem ambiente" na sua verdadeira escala, o direito corre o perigo de ocultar o seu verdadeiro sentido, e o seu *dever-ser*. Neste acórdão, "o nosso Supremo Tribunal de Justiça, realiza a difícil tarefa de organizar (de forma estratégica e prudente) a passagem de uma intencionalidade espiritual, um *dever-ser* patente nas normas constitucionais, para um "ser" realizado por esse espírito, e tornar-se num promotor efetivo do processo histórico-cultural, apontando o afinamento da estratégia de ação, assumindo a dimensão vital do jurídico no seu sentido modelador da vida, perante aquela que é considerada como a principal crise com que a humanidade alguma vez se defrontou (Magalhães 2005:96)."

Esta dimensão qualitativa - *the healthiness* – do Sistema Terrestre, escapa às abordagens jurídico-dogmáticas tradicionais sobre o ambiente, pelo facto de ser impossível isolar um determinado ecossistema, região ou país, da qualidade do sistema global. Isto é, as principais características do "bem ambiental" são a sua globalidade e intangibilidade – o Sistema Terrestre é global e indivisível, e a qualidade do seu estado depende da sua estrutura biogeoquímica global, uma vez que esta vai ser determinante no funcionamento dos seus fluxos e balanços energéticos – os chamados ciclos biogeofísicos. Estas características obrigam a que a proteção do ambiente se alargue à proteção de bens intangíveis naturais, e à escala em que o bem existe – a global.

Ora, o cumprimento da função modeladora do direito e de concretizar esta passagem de um *dever-ser* de um ambiente "sadio e ecologicamente equilibrado", para a construção de uma sociedade humana adaptada ao funcionamento do Sistema Terrestre e aos seus limites, implica uma nova visão do mundo em que esse "bem ambiente" será mais do que a soma dos conceitos indeterminados presentes numa alargada quantidade de Constituições Estatais e em Tratados Internacionais. O desafio que o Antropoceno coloca ao Direito é o de através de um exercício de interdisciplinaridade se tornar numa ciência promotora do processo histórico-cultural que leve ao reconhecimento "deste ambiente sadio e ecologicamente equilibrado", como um bem jurídico na sua verdadeira escala – a global - e relativamente ao seu verdadeiro sujeito – a comunidade humana na sua globalidade.

A relevância vital do *Safe Operating Space for Humankind,* é uma factualidade inultrapassável. Só que este fenómeno agora conhecido e definido, não é ainda socialmente reconhecido por nenhuma norma, nem a realização de benefícios ou danos no estado deste bem comum vital é desencadeadora de consequências jurídicas. A necessidade da sua internalização por parte da organização das sociedades humanas, parece uma evidência. O facto de este bem existir dentro e fora de todas as soberanias, não pode ser um obstáculo ao seu reconhecimento como um fenómeno relevante para a humanidade. Isto é, a partir do momento em que determinado facto ecológico se torna da maior relevância para o ser humano, é natural que esse bem que até ali tenha sido considerado irrelevante, seja reconhecido como bem e jurídico.

Não só o bem jurídico é uma construção puramente humana que existe num processo de permanente evolução e aperfeiçoamento histórico, como também lembra Bosselmann (2015:61), as construções jurídicas humanas existentes, não são um valor *per si*: "It may be time now to remind ourselves that the law has no intrinsic value, but is a mere human

construct intended to govern ourselves in a civilized manner. However, what could be more civilized than caring for the conditions that make human life possible in the first place. It is here where the concern for the integrity of life as a whole has its place. And it is here where a renewed sense of the rule of law must have its beginning."

O principio de tudo, da possibilidade da construção de uma civilização humana como a que possuímos hoje dependeu destas condições favoráveis intangíveis que hoje conseguimos identificar e mensurar. E a partir do momento que os limites do planeta do Holoceno são quantificáveis, essa integridade pode ser usada como medida de legalidade do agir humano.

Isto é, o "bem ambiente" estado favorável do Sistema Terrestre, como fenómeno natural do mundo real, que anteriormente se aparentava como imutável e infinito cujo o fazer humano era incapaz sequer de o atingir ou alterar, passou de juridicamente irrelevante e inexistente, à mais valiosa herança recebida pela humanidade da natureza. Esse novo bem, resultante de uma valoração enunciada por uma norma jurídica, irá ser irradiador de direitos e deveres que deverão constituir a base organizativa do uso regulado deste bem comum global, da qual poderá emergir uma nova harmonização das relações humanas que agora se alargam ao global.

2.4. A desmaterialização do Bem Ambiental

O facto de o estado favorável do Sistema Terrestre ser, como o próprio nome indica, um sistema, e como tal ser essencialmente composto por elementos não-territoriais e intangíveis, isto é, pelos ciclos biogeofísicos que se dispersam e atravessam todo o planeta, não pode constituir um obstáculo intransponível à sua qualificação como fenómeno ecológico juridicamente relevante para o ser humano.

A existência de coisas incorpóreas, há muito que é reconhecida pela cultura humana. O conceito de *coisa incorpórea* e a sua estrutura de definição buscam as suas origens na filosofia grega, mais especificamente da escola aristotélica: de facto, Aristóteles diz-nos que coisas incorpóreas são aquelas que não podem ser tocadas. O que pode ser percebido com os sentidos é um *corpus*, uma coisa corpórea; o que não pode ser tocado é uma coisa incorpórea, apenas percetível através do intelecto. Os juristas romanos seguiram os passos

da cultura grega, e classificaram os bens como: *res corporales* e *res incorporales.* Segundo Mousourakis (2012:121,122) "With respect to the *res in nostro patrimonio (or res in commercio)*, a distinction was drawn between corporeal (*res corporales*) and incorporeal thing (*res incorporales*). The former term referred to things that could be touched or perceived by the senses such as a garment, an ox, a table or a house. The term *res incorporales*, on the other hand, denoted intangible things no capable of sensory perception that the law recognizes and protect, such a real and personal rights. (…) Because incorporeal objects could not be physically seized as required for possession to exist, they thus could not be acquired or transferred by any method involving the acquisition or transfer of possession."

Coisas corpóreas são aquelas que pela sua natureza são dotadas de existência física, material, que podem ser tocadas, como um terreno, uma casa, etc... . Por outro lado, coisas incorpóreas, são aquelas coisas que embora não possam ser tocadas, possuem uma existência abstrata ou ideal, isto é, existem para a lei; como por exemplo, uma herança, usufruto ou uma obrigação. Inicialmente, apenas os direitos reais eram considerados *res incorporales*. Posteriormente, como resultado de uma luta liderada pelos dos intelectuais do século XVIII, que reivindicavam reconhecimento das "ideias" ou "criações do espírito humano", segundo o principio de que a obra é *independente de qualquer fixação ou materialização* (Ascenção 1992.62), os direitos pessoais foram igualmente reconhecidos como coisa incorpórea. O reconhecimento "obra humana" como coisa incorpórea, isto é, de que a ideia *per si*, depois de tomar forma no foro íntimo do autor e de ser exteriorizada por qualquer meio de forma que seja possível ser captada pelos sentidos, teve o seu reconhecimento como objeto juridicamente relevante em 1710 através da célebre lei do *copyright* da Rainha Ana de Inglaterra. Através desta lei o direito de reprodução, já não pertencia em favor dos impressores, mas já em favor dos autores, constituindo simultaneamente um direito pessoal do autor e um novo objeto jurídico imaterial. Isto é, este normativo legal permitiu estabelecer uma divisão jurídica entre o direito intangível do autor e o suporte material em que a obra está gravada, criando desta forma um objeto jurídico intangível – a ideia, a criação intelectual do autor. É esta separação, que nos permite por exemplo, que ao comprarmos um livro apenas adquiramos a titularidade sobre o papel e tinta que constitui o suporte da gravação da obra, e não os sobre os direitos relativos à obra que está ali gravada. De juridicamente inexistente até ao início do Século XVIII, a ideia intangível do autor, tornou-se, na opinião dos intelectuais da época, na "mais sagrada de todas as propriedades".

Estas soluções técnico-jurídicas constituem alguns dos alicerces estruturais em que se baseia a nossa organização social. Por exemplo, sem esta separação legal entre a ideia intangível de um autor e o suporte tangível onde esta ideia é registada, não teria sido possível o desenvolvimento do conhecimento nem sua disseminação em massa. Mas o reconhecimento jurídico de objetos intangíveis não se ficou pelo *copyright*. O património cultural imaterial reconhecido através da UNESCO, ou o valor intangível das empresas em direito comercial, onde frequentemente o valor dos ativos intangíveis de uma empresa são incomparavelmente superiores aos ativos tangíveis, são outros exemplos em que a necessidade de organizar o uso de algo ou a relevância dos bens em causa, justificaram a busca por novas soluções por parte do direito. Os objetos jurídicos intangíveis foram um fator determinante de desenvolvimento e um suporte estrutural crítico na criação da civilização em que vivemos hoje.

A analogia entre esses objetos de direito intangíveis e o Sistema de Terrestre igualmente intangível pode também ser crucial para representar e compreender a funcionalidade global e indivisível do Sistema da Terrestre na nossa sociedade, bem como o valor real dos ecossistemas naturais, onde o valor intangível dos seus serviços para a humanidade é incomparavelmente superior ao valor tangível das infraestruturas naturais que produzem esses serviços. Atualmente, por exemplo, o valor das florestas que são vitais para a manutenção desse estado favorável, das nossas vidas e as futuras gerações só se tornam visíveis nas transações financeiras e económicas da sociedade através da destruição e transformação dessas florestas em madeira. Na verdade, também na natureza existem outros tipos de património para além daqueles que podem ser vistos e tocados. Isto obriga a pensar o conceito de capital natural, não apenas como o espaço e as infraestruturas ecológicas tangíveis, mas a considerar o seu conjunto, como a soma resultante da totalidade da infraestrutura ecológica tangível e da totalidade alterações químicas biogeofísicas positivas que constituem os serviços ecológicos globais intangíveis. Feitas as contas, tendo em conta o caracter vital destes serviços e a sua escassez, os ativos intangíveis naturais terão uma importância muito superior aos proporcionados pelos recursos físicos tangíveis na produção de bens e serviços.

Este processo histórico é da maior importância para percebermos como este processo de desmaterialização do objeto do direito foi um fator estrutural de profundo significado na construção das sociedades modernas, e como as soluções jurídicas organizativas são um fator estrutural dos modelos sociais.

2.5 A natureza intangível como conexão entre Sistema Social e Sistema Terrestre.

Num trabalho recente sobre o Global Commons no Antropoceno (Nakicenovic,N., Rockstrom,J., Gaffney,O. 2016), identificam-se alguns biomas críticos como bens comuns globais: "The critical biomes (Figura 3) that regulate regional energy flows, hydrological flows, and carbon, nitrogen and phosphorus cycles and provide stable habitats for living species are under threat. These biomes are interconnected with each other – moisture feedback from the Amazon rainforest affects the temperature and function of the tropical monsoon system, which in turn may interact with the global climate system. Critical biomes play a decisive role in regulating the overall status of the life-support system on Earth, that is, how well Earth can support world development. Significantly, the resilience of ecosystems, critical biomes, and the biosphere as a whole determines the degree of feedback (negative or positive, weak or strong) to the climate system, which regulates the degree of global warming, which in turn, generates a direct feedback to the biosphere, affecting all ecosystems."

Global Commons in the Anthropocene	Description	Importance for Earth resilience	Importance for societal resilience
Biodiversity			
• Biodiversity	Condition critical: average rate of vertebrate species loss over the last century is up to 100 times higher than the background rate (Ceballos 2015)	Regulates key Earth-system processes	Essential for ecosystem services, e.g., pollination, food security, water purification, wellbeing, health
Biogeochemical cycles			
• Carbon	Condition critical: changing at a rate not seen for possibly 65 million years	Regulates climate system and thereby Earth system	Impact on climate stability, translating into social shocks and undermining of livelihoods
• Water	Finite and key to sustainment of all Earth-system functions and social systems. Rising variability, rising scarcity, rising pollution, undergoing rapid change	Essential for living biosphere and for functioning of Earth (upholds negative feedback like natural carbon sinks in oceans and on land)	Non-negotiable basic component of human development, for food, health, energy, materials, social stability
• Nitrogen	Changing at a rate not seen for possibly 2.5 billion years	Regulates ocean and biosphere stability	Essential for agriculture
• Phosphorus	Released into Earth system at unprecedented rate causing regional-scale state changes	Regulates ocean and biosphere stability	Essential for agriculture
Critical biomes			
Rainforests		Risk of shift in feedback from negative (carbon sink) to positive (carbon source)	
• Amazon	Reduced resilience: ability to store carbon is diminishing	Critical for carbon sinks, biodiversity, moisture feedback for regional rainfall, and climate system teleconnections across continents	Community livelihoods, food, largest genetic diversity on Earth, bioresources, tourism
• South Asia	Condition critical: under severe threat		
• Africa	Reduced resilience: under increasing threat		
Boreal forests		Risk of shift in feedback from negative (carbon sink) to positive (carbon source)	
• North Europe	Healthy, resilient, and providing global ecosystem services	Critical for carbon sinks, biodiversity, and moisture feedback at regional scale (between upwind/downwind nations)	Energy, bioresources, recreation
• North Asia	Healthy, resilient, and providing global ecosystem services		
• North America	Healthy, resilient, and providing global ecosystem services		
Cryosphere		Risk of feedback shift in Albedo from negative (cooling) to positive (warming)	
• Antarctica	Parts of West Antarctic ice sheet may have destabilized. Critical threshold: 3°C	Sea-level rise, disruption of ocean circulations and global carbon cycle	Sea level rise will affect coastal zones
• Arctic	Stability of Greenland ice sheet, permafrost and summer sea ice now in question	Sea-level rise, Arctic ecosystem collapse, disruption of ocean circulations and global carbon cycle – positive carbon feedback amplifying warming	Risk of collapse of indigenous pastoral reindeer societies. Regional societal impact, plus teleconnected impact through trade
• Mountain glaciers	Mountain glaciers worldwide are retreating, threatening water supply	Global water cycle, amplification of warming through positive climate feedback	Regional water supplies

Figura 3. Global Commons in the Anthropocene: World Development in a Stable and Resilient Planet. Nakicenovic,N., Rockstrom,J., Gaffney,O. and Zimm,C., IIASA Working Paper – WP16-019. P.29,30. 2016

Como observamos na figura 3, os critérios que estiveram na base da escolha destes *Global Commons in the Antropocene* tiveram por base um critério qualitativo-funcional, à qual acresce a dimensão da quantidade em que estes serviços qualitativos são prestados, resultando na definição das infraestruturas ecológicas que possuem maior relevância na resiliência do planeta. Isto é, da soma da qualidade e da quantidade dos *global ecosystem services* prestados, resulta a sua classificação como *Critical Biomas*. No entanto esta listagem merece da nossa parte a seguinte análise crítica:

a) *Biodiversidade global* – embora seja abordada na ótica da perda total em número de espécies, ela não deixa de estar territorialmente vinculada aos Estados onde essas espécies e comunidades; habitats e ecossistemas estão localizados. O mesmo também se pode referir quanto ao país de origem dos recursos genéticos, isto é, "Country of origin of genetic resources – The country which possess those genetic resources in situ conditions", conforme definido no artigo 2º da Convenção da Diversidade Biológica. A biodiversidade possui uma existência material que é em grande medida geograficamente delimitável, e como tal, reivindicada pelos Estados que exercem a jurisdição sobre os territórios onde a biodiversidade está localizada;

b) *Os ciclos biogeoquímicos* - elementos não-territoriais e intangíveis, com uma circulação permanente de caracter global não geograficamente delimitável, e cuja divisão jurídica ou apropriação física são impossíveis;

c) *Biomas Críticos* – vários tipos de infraestruturas ecológicas que prestam esses serviços de ecossistema de impacto e interesse global, possuindo dessa forma um valor determinante na manutenção e resiliência do Sistema Terrestre (Florestas Tropicais, Florestas Boreais, Criosfera), mas que são territorialmente delimitáveis. Nesta listagem identifica-se mesmo a sua localização específica, como por exemplo: Amazónia, Florestas Tropicais da Ásia do Sul, Florestas Boreais da Europa ou os Glaciares de Montanha de todo o mundo.

Se de um ponto de vista das Ciências do Sistema Terrestre, a identificação destes biomas críticos faz todo o sentido, já a sua classificação como *Global Commons,* merece dúvidas da nossa parte. Como conceito jurídico que é, e segundo a própria definição da UNEP- "The 'Global Commons' refers to resource domains or areas that lie outside of the political reach of any one nation State. Thus, international law identifies four global

commons namely: The High Seas; the Atmosphere; Antarctica; and, Outer Space. These areas have historically been guided by the principle of the common heritage of humankind - the open access doctrine or the *mare liberum* (free sea for everyone) in the case of the High Seas. Despite efforts by governments or individuals to establish property rights or other forms of control over most natural resources, the Global Commons have remained an exception."

O critério que fundamenta esta classificação proposta para os *Global Commons in the Anthopocene* não é o particular interesse científico, estético ou natural de um ou outro bioma, mas sim a importância qualitativa em termos do impacto que estes biomas críticos possuem nos ciclos biogeoquímicos globais e a consequente influência destes nos fluxos energéticos, que no conjunto da sua interação são determinantes na manutenção do estado favorável do Sistema Terrestre. Ao incluir nesta lista de Global Commons para o Antropoceno os ciclos biogeoquímicos, os biomas críticos e a biodiversidade, esta proposta mistura no mesmo conceito elementos territoriais ou territorialmente delimitáveis com elementos não-territoriais. Como é sabido, do ponto de vista jurídico, e de acordo com o principio da territorialidade, não é possível classificar como *Global Commons* parcelas de território que estão sob a jurisdição de um determinado Estado. É uma ilusão pensar que um Estado que possua no interior no seu território algum destes biomas críticos, vá abdicar da soberania sobre essa parcela de território em favor de um regime legal de *Global Commons* ou Património Comum da Humanidade.

Reconhecendo a importância determinante destes biomas nos ciclos biogeoquímicos globais, a solução passará inevitavelmente pela procura de novos conceitos baseados nos conhecimentos científicos entretanto desenvolvidos e que procedem a uma leitura da realidade não exclusivamente territorial.

Sendo certo que todos estes biomas críticos são territorialmente delimitáveis e tangíveis, estando sob a jurisdição de um ou mais Estados (com exceção da Antártida e do Ártico), e que o motivo desta classificação é a sua contribuição determinante na manutenção do estado favorável do Sistema Terrestre, somos obrigados a chegar à conclusão de que o que é verdadeiramente comum a toda a humanidade são os benefícios(os "*global ecosystem services"*) realizados por esses biomas nos ciclos biogeofísicos globais. Por outras palavras, o que é realmente *Global Common* nestes biomas, são os serviços intangíveis prestados a todo o Sistema da Terrestre, e não a infraestrutura natural física em si, que está sob a jurisdição de um ou mais Estados. Quer isto dizer que se repudiarmos a tentação materialística e territorialista, e procedermos a

uma distinção jurídica entre os serviços intangíveis dos ecossistemas e a infraestrutura tangível natural que os realizou, isto é, reconhecendo que a natureza não é apenas o conjunto dos bens tangíveis que formam o ecossistema (por exemplo florestas tropicais) e o espaço geográfico delimitável e mensurável em hectares, mas também o ativo intangível concretizado pelas alterações positivas nos ciclos biogeoquímicos que ali se processam, podemos criar uma representação da natureza com uma maior capacidade de a retratar e traduzir o seu real valor.

Dado que estes ciclos existem apenas na escala global, só a criação de um objeto de direito intangível global pode representar este fenómeno natural da maior relevância para a humanidade – o Sistema Terrestre. Só através do reconhecimento de um objeto legal com as mesmas características do "bem ambiental" – global e intangível - poderemos ultrapassar este dilema entre a delimitação territorial das sobernais e o funcionamento global do Sistema Terrestre.

A realidade é que o nosso planeta não é apenas uma área geográfica com 510 milhões de km2. Na verdade, todos os planetas conhecidos têm uma área geográfica que pode ser dimensionada em km2. O que os outros planetas não possuem é um sistema intangível acoplado ao planeta físico, capaz de sustentar a vida, tal como a conhecemos. Do ponto de vista jurídico, o planeta tem apenas uma existência: a área do território. Essa visão unidimensional deixa de fora a expressão mais notável e vital da natureza - o funcionamento do Sistema da Terra como um sistema de suporte de vida único e complexo.

Se aceitarmos que a natureza possui igualmente uma dimensão intangível, que o Sistema Terrestre é o nosso principal *Global Common*, e encontramos forma de representar esta realidade factual na nossa organização social, reconhecendo-o como bem juridicamente relevante do qual deverão emergir consequências jurídicas, novas formas de coordenação global podem ser imaginadas.

Se, tal como nos direitos de autor, em que existe uma separação jurídica entre a obra e o suporte físico em que está gravada, procedermos igualmente aqui a uma separação legal entre os serviços intangíveis produzidos pela infraestrutura natural tangível que forneceu esses serviços, e esses serviços intangíveis se tornassem socialmente visíveis num novo objeto legal intangível global, esses serviços passariam a ter sua existência reconhecida no novo bem comum global, dessa forma os *global Earth System services* poderiam tornar-se em ativos económicos intangíveis. O sistema usado para capturar na escala global todos estes serviços de ecossistema que contribuem para a manutenção dos

ciclos biogeofísicos num estado favorável (o património comum intangível global), também poderia ser usado para capturar os danos que lhes são infringidos, e dessa forma construir um sistema justo de contabilidade.

Se a esta contabilidade de fluxos positivos e negativos para a manutenção dos ciclos biogeofísicos, lhe associarmos um sistema de pagamentos pelas utilizações que contribuem para nos afastarmos do espaço de manobra seguro para a humanidade, e de compensações pelos benefícios que contribuem para a manutenção deste espaço, estaremos a promover a de forma estrutural a construção de uma sociedade sustentável.

Ao compensar o Estado que tem jurisdição sobre o território onde foi produzido o serviço que beneficia o estado do Sistema Terrestre, indiretamente, estamos a promover proteção e restauração das infraestruturas naturais, promovendo a equidade e a justiça entre os povos e influenciando a governança desses territórios, sem, no entanto, ameaçar a soberania dos Estados.

O reconhecimento de objetos legais intangíveis não é novo nas ciências jurídicas, pelo que o trabalho que nos propusemos realizar aponta para a necessidade de atribuirmos relevância jurídica à natureza intangível como forma de ultrapassarmos o impasse estrutural da não-adaptação da nossa organização social ao funcionamento global do Sistema Terrestre, tendo na sua base nos seguintes argumentos:

a) Os processos biogeofísicas intangíveis são fenómenos naturais que determinam o funcionamento e o estado do Sistema Terreste, os chamados - *core drivers* - neste sentido são absolutamente vitais para toda a humanidade;

b) Porque mesmo apesar de serem atualmente considerados como "externalidades" económicas, o valor dos serviços dos ecossistemas para a humanidade é incomparavelmente superior ao valor tangível das infraestruturas naturais que os produzem;

c) Porque apesar de serem hoje economicamente invisíveis, a ausência de uma provisão regular destes serviços tem como consequência prejuízos económicos muito superiores ao custo de provisão;

d) Hoje possuímos as ferramentas científicas necessárias para definir este bem natural intangível global, e o seu estado favorável- o *Safe Operating Space for Humankind*;

e) Porque só através do reconhecimento da sua existência é possível establecer um regime legal que organize o seu uso. Essa é também uma condição estrutural para ser possíve promover a sua manutenção permanente;

f) Porque o reconhecimento dos serviços de ecossistema globais produzidos pelas infraestruturas ecológicas como ativos intangíveis é a forma de introduzir o trabalho da natureza nas nossas sociedades sem necessariamente implicar a destruição da infraestrutura natural;

g) Porque o reconhecimento da existência da dimensão intangível da natureza é uma condição estrutural para construir equidade e justiça nas relações entre os seres humanos à escala global, e de essa forma promover igualmente a adaptação da comunidade humana à forma de funcionamento do Sistema Terrestre;

h) Porque este reconhecimento é uma condição estrutural para construir uma economia de manutenção do Sistema da Terrestre e restauro da nossa Casa Comum;

i) A utilização de objetos legais intangíveis no que diz respeito ao Sistema Terrestre é crucial para tornar visível o que realmente importa e nos une a todos como uma comunidade global de interesses vitais interdependentes e comuns;

j) Porque a construção de uma ficção jurídica relativamente ao "espaço de operação segura para a humanidade" como um património comum é também a forma de construímos um "território virtual" onde a Humanidade poderá basear a sua organização, e onde os interesses das gerações futuras poderão estar representados independentemente da existência jurídica das pessoas concretas futuras que irão depender da proteção desses interesses.

Esta proposta de construção de um suporte jurídico global relativamente a um fenómeno natural ao qual, em nosso entender, deve ser atribuída relevância jurídica, tem como objetivo transcrever legalmente a complexidade das conexões entre seres humanos que se realizam através do uso do Sistema Terrestre. Com a presença deste novo elemento no contexto do Direito Internacional, devem emergir um conjunto de direitos e obrigações correspondentes, que obrigam a repensar a relação entre todos os povos do mundo.

A gestão do uso do Sistema Terrestre implica uma "gestão do sistema" que transcende a "gestão-territorial" dos Estados e tem como objetivo principal a responsabilidade pelo bem comum de todos, incluindo as gerações futuras e outras formas de vida com as quais compartilhamos o planeta.

Chapter 3

Global Free Riders ...[4]

"A human being is a part of a whole, called by us **universe**, a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest... a kind of optical delusion of his consciousness."

Albert Einstein

3.1. Tragedy Without Territory

It is now widely accepted that climate change is a "tragedy of the commons" on a global scale. When a tragedy is occurring simultaneously inside and outside all borders, it does not comply with the principle of territoriality of jurisdictions or of norms. It is a superimposed common reality in all territories, without having a territory. Also, in the dominant view of "territorial obsession", existing is to have territory. Being global is not having territory. The underlying principle is the assumption that everything that goes beyond our limits should be considered as external to us – an externality in the words of economists. Pollution from an aircraft is an externality for the economy and when performed outside the airspace of states, it becomes a case for jurists.

Based on this vision, one can define common areas where theoretically all of humanity becomes sovereign over the international commons (*res communis omnium*), in which the "common" is what is left over (open sea, seabed, Antarctica), the remains of what could not be seized. Pureza (1998:26) considers that "the *res communis* own regime as a traditional framework for common international spaces is a sequence rather than an

[4] Capítulo realizado em co-autoria com Francisco Ferreira.

antithesis of the national sovereignty principle". The common is not that by which its nature and characteristics is truly common but what remains after appropriation.

In the confrontation between this one-dimensional simplification of the world and the highly complex and deeply interconnected Earth System, we are flooded with more questions than answers: Whose tragedy? Where does the responsibility for acting lie? Who has the instruments to act for the benefit of all? How can we speak about benefiting everyone if humanity, being global, has no territory, a fact that by itself gives rise to its legal non-existence? Yet, are there any organized people in a territorial political community that do not belong to humanity? If humanity exists materially, and is just one single family with a common origin, will it cease to exist just because it doesn't exist in a formally organized political territory? Can the concept of sovereignty exist without the prospect of an unlimited temporal projection into the next generations?

As sophisticated as societies and their technologies can be, the organization of social life leads us invariably to the same primary questions: What is mine? What is yours? What is common or public, or what doesn't belong to anyone? But the reality is always more complex than these simplified operations. To the questions whose simple solutions of separation serve as responses, we can add another: What is simultaneously mine, yours and everyone's in an overlapping and symbiotic way?

As we will see throughout this book, there is no simple answer to this complex question, especially if we look at property not only as a form of ownership over something but also as an organizing tool of social relations. It is at the crossroads of belonging to all, owned by no one where 'belonging to' does not have any clear legal definition, and whose outcome is often resolved by resorting to *res nullius*. Kiss (1982:122) came very close to the essence of the issue when he asked: "*How can a good that belongs to no one be subject to a legal regime*?" From this paradox, and because legal existence is inextricably linked to some form of "ownership", emerges what was classified as the doctrine of "complex property".

New questions always elicit new answers. However, it is interesting to note that even as we surpass the Earth's borders and launch into the conquest of space, the same classic questions invariably arise. Oosterlinck (1996:1), in his article "Tangible and Intangible Property in Outer Space", states: "Property in space is certainly one of the most important issues for the future not only in the context of the more classical form of tangible property such as minerals but also intangible property such as orbital slots on the geostationary orbit, frequencies, etc."

Only with clear and precise legal answers to these primary questions might there surface an element of stability, without which the construction of any organization is impossible, and therefore the construction of any future. Transferred from one earthly reality dominated by territorial and tangible dimensions, we are now involved in a spatial reality dominated by apparent emptiness and the intangible. Although within an environment that is strange and cannot be 'comprehended' by our senses, the ability to explore new resources and carry out activities that open new possibilities on Earth created the need to internally organize our relationships concerning the use of these new intangible spaces; therefore the classical questions arise again, with new variations.

The possibility to regulate the use of certain goods involves the ability to first describe, measure, locate and name them, and then to classify them. In other words, in order to regulate the use of a certain good, we have to have defined it.

The legitimacy of a theoretical construction always depends on its explanatory capacity of reality. In Space, unlike on Earth, the classification of any legal regime should take as its starting point the reality of the intrinsic characteristics of the goods and not a previous theoretical construction later applied to the goods in question. This process, whose initial impulse is the well-known reality, was similar to the approach carried out by Roman law, which therefore continues to be used in Space today. According to Oosterlinck (1996:2), "Under Roman Law, 'Res', or things, are classified into *res corporals* and *res incorporales*". It was in the Roman legal system where the "emptiness" of space found a concept *(res incorporales)* to explain the new reality of the *areas in outer space or langrangian points, orbits including specific slots of certain orbits, trajectories and to certain extended frequency spectrum.* But even so, "Within *res corporals* a certain number of things are excluded from trade '*res quarum commercium non est*', normally referred to *res extra commercium*". That is, there are other features regarding the nature of the good itself that makes its trading impossible, and are essential elements in the definition of the legal regime.

This qualitative approach of Roman law differs immediately from the current approach of monistic simplification, which is merely spatial/geographic, between the things that are within the territory of states and those that are outside the jurisdiction of states.

For Roman law, the *res communis omnium* are available to all and cannot be owned by anyone, not even by a state; for example, the air, rain and flowing river water, the sea and shore. Therefore, the origin of the *res communis omnium* was not one territorial

division, an abstract criterion where the common is only the part remaining after appropriations; the good's intrinsic qualities led to the classification of its legal status.

It is very interesting to note the distinction between *source* and *resource* in the analysis of the Roman legal system and the constraints that this distinction imposes on the use and exercise of property. In practice, the Romans looked differently upon the issue when considering the sea as a whole and when considering its constituents. In the former case, they qualified it *res communis omnium* and the latter *res nullius*. Or, in more general terms, "*res communis* differs from *res nullius* in that the *source of resources* cannot be appropriated but the resources themselves are amenable to appropriation. (…) *Res nullius* may be subject to appropriation through effective occupation and the will expressed by the (new) owner to exercise ownership (*corpore et animo*)" (Oosterlinck 1996:2). The intrinsic quality of the good and the possibility of its effective possession, to acquire ownership, were decisive in the classification of the regime applied to it.

The "ocean the whole" was the source, which by its very nature was inappropriable, and the fish in it one appropriable resource. The fact that it is inappropriable and common to all, and therefore global, does not necessarily mean that it doesn't exist or that some of its constituents may be physically appropriable.

That being said, another crucial problem in defining the use and ownership regime was the feature of inexhaustibility.

> These resources were looked at as inexhaustible and their appropriation was physically possible and would moreover only be partial, leaving thus the possibility to others for future exploitation and use of the sea. Hugo Grotius evokes however, though briefly, the possibility that fish could be an exhaustible resource of the sea but in his view this would not alter the legal status of the sea as a whole. (Oosterlinck 1996:3)

> (…) if it were possible to prohibit any of these things, say for example, fishing, for in a way it can be maintained that fish are exhaustible, still it would not be possible to prohibit navigation, for the sea would not exhausted by that use. (Grotius 1916)

Therefore, in summary, we can pose some questions that are central in determining property regimes: the possibility to appropriate the good or otherwise; if the good has an in- or exhaustible character, or better yet, if the use of the good, without a physical appropriation of it, may or may not lead to the exhaustion of it. Throughout the article,

the author, using a theoretical analogy between ocean and space, between source and resource, analyses the existing legal regime and the options whose, in his opinion, performance is still required in the organization of the use of this new frontier where natural intangible resources are also limited (as in the spectrum of frequencies or the geostationary orbit). As in all areas in which the law has been called into action, a precise clarification of the various types of ownership is needed in space too, in order to organize the relationships established around the use of sources and resources, which, by being exhaustible, cannot be used according to a free-access regime.

Synthesizing the previous analysis:

1) Roman law distinguishes between the source that is not appropriable and the resource that can be physically appropriated;
2) Grotius analyses the exhaustible or inexhaustible character, which is decisive in defining the ownership regime, access or use of the good;
3) There are some uses of the good, although not corresponding to a physical appropriation, that can lead to its exhaustion; and
4) In the outer space law, intangible property is not only confined to human intellectual property.

Based on this summary, we realize that there are also natural intangible resources in the Earth System that can be exhausted by some uses, although they can escape our senses.

With climate change and the discovery that a stable climate is not an inexhaustible factor, that is, the *incorporales* biogeophysical conditions that determine the state of the Earth System have upper and lower limits and therefore are exhaustible, the "ownership" of this resource is not realized through a physical occupation but rather through its use, i.e., as a change in the qualitative state of its incorporeal characteristics.

One should consider the recent period of relative climate stability corresponding to the Holocene (the last 11,700 years after the last ice age), which has been the basis for the development of human civilizations (the history of the human species corresponds to a period of about 200,000 years), as a particularly favourable state of the Earth System for our species and for others that share the same ecological conditions. Every time a state, company or an individual contributes to a change in the biogeochemical conditions of this period of stability, which has benefited all humankind, an "externality" in the natural

res incorporales is generated, affecting all other users of this favourable state as less resource (considering the stable state of the Earth System as a resource) will be available to all agents.

The biogeochemical conditions that ensure a stable climate and the favourable conditions of the Holocene are a natural intangible limited resource on Earth. The favourable conditions of the Holocene arose in an evolutionary fashion throughout Earth's history and it is through this evolutionary process involving the living part of the planet as well as the geophysical that, for example, the relative concentrations of gases have remained relatively constant through time. In essence, it is the integration of the geophysical properties of the planet with the living biosphere that forms the intangible Earth System, a single global system incapable of any legal abstraction of division.

In the source/resource Roman law perspective of analysis, the source of this favourable state was the living biosphere and its interactions with the geophysical components. In other words, the sources are the ecological infrastructures, and the resource the biogeochemical conditions of the state of the Earth System.

We have been exploiting a vital resource we did not even know existed; nor did we know if it was exhaustible or inexhaustible. The stable climate was, quite simply, a pre-acquired data. The possibility of it being affected by human activity was a hypothesis that did not even arise. The only value we truly recognized was in the sources of this unknown global resource, which was the primary activator of their massive destruction (for example, more than 80% of the original forests). This is a new situation in regard to its possible classification. First, the natural resource is intangible and as such is not physically appropriated. Second, this good does not recognize land, air or ocean borders. It refers to a specific biochemical structure of the atmosphere and of the oceans, and its integration with the geophysical properties of the planet with the living biosphere that forms the intangible Earth System. In this respect, taking into account their characteristics and the ways in which these *res incorporales* were being perceived over time, we can identify some similar elements in four possible categories:

1) ***Terra Incognita****:* The intangible higher level of integration of the Earth System, because it was unknown, can be considered a true *terra incognita,* an "unknown space", traditionally defined as regions never mapped or documented.

2) ***Res Nullius:*** The change in the biochemical structure at the higher level of the Earth System can be considered to have been carried out under the *open-*

access regime condition, without rules, and in this sense is a *res nullius*. A good, being a *res incorporales* and an unknown resource, is not suited to traditional effective occupation, that is, a conscious will to ownership (*corpore e animo*). However, its use can lead to its exhaustion.

3) ***Terra Nullius:*** In the Middle Ages, *terra nullius* was used to define unclaimed or unoccupied territories, usually situated between fiefdoms and used as dumps for garbage and deposits. Although intangible and non-territorial, the fact that pollution legally disappears in the legal inexistence of the Earth System allows us to consider it as a no-man's land, as the place to send waste, and therefore an externality.

4) ***Res Communis Omnium:*** The Earth System is available to all and cannot be appropriated by anyone, not even by a state. When this common property extends to all humankind, the goods come to be considered as *res omnium.* They are the common heritage of humankind so all human beings, both the present and future generations, have the right to access them in a favourable state. However, given its character as an exhaustible resource, it is necessary to create a legal framework for both the use and the benefits realized in the common good.

3.2. Legal Black Hole

The "global" is therefore a new reality that is outside the legal frameworks built to date. Within existing classifications, although we can find some elements that partially adapt to this new reality, there is no legal asset that is simultaneously global and *res incorporales* with the ability to reflect the harmful changes of the biochemical structure of this favourable state of the Earth System. In the same manner, there is no way to capture or account for the benefits provided by ecosystems in the maintenance of a favourable state and enjoyed by all on a global scale. This new reality, already accepted and recognized by science and clearly visible from space, still remains invisible to the law.

If we take as a starting point the current prevailing view that the common is not by its nature truly common but what remains after appropriation, and if to this view we join the legal invisibility of the higher level of the Earth System as a whole, what remains is not a *terra incognita* but truly an *incognita sine terra*.

Terra incognita was the term used in the 15th and 16th centuries to mark unknown land – the regions that had never been mapped or documented. After *terra incognita* had disappeared from our maps and the planet had "become spherical", where one could go back to the point of origin without going backwards, a first major step was taken towards realizing the overall unity of the planet at the geographical level of integration. We had, however, to wait until almost the end of the 20th century to realize that the planet and its operating system had more than a well-defined geographical, physical and palpable dimension. A new reality was revealed when we discovered that the gases and substances emitted into the atmosphere not only did not disappear in space but were also interchanged with the land and the oceans, or that what was released into the sea did not disappear into an ocean of infinity. Step by step, science was uncovering the upper level of integration of an Earth System with global and complex interconnections that were difficult to observe and define. However, despite their intangible and systemic nature, these relationships are not an abstract abstraction. Although this higher level of integration requires an abstraction to be considered as such and also explained, it is nonetheless incredibly obvious, based *in res incorporales*, that we are talking about a real world that everyone and everything is part of.

According to Melot & Pélisse (2008) we can say that, the Earth System is still considered to be *an unidentified legal object* –resulting in a large *legal black hole* through which vital positive flows (benefits to the state of the Earth System) and negative flows (harm to the state of the Earth System) "disappear" as externalities. If the principle of disjunction in natural sciences "hid everything which connects, interacts, and interferes" in law, the paradigm of division "made believe that the arbitrary cut of the real was the real itself" (Morin 1990:17). The concept of a "system" emphasises the concept of the medium, that is, not only the *physis* as a material basis but also a mediation mechanism of biogeochemical cycles and thermodynamics "in which reciprocal interactions inside the system between the framework and its processes contribute to the regulation of dynamics and the maintenance of their organization, in particular thanks to feedback phenomena" (Lévêque 2002:40). This enables a well-defined characteristic functioning as a single global complex ecosystem, which in reality is a life- support system for the entire biosphere, including humans, on Earth. Of course, the biosphere itself is a critical part of the Earth System, fully integrated with the geophysical components of the system itself.

The legal inexistence of the *favourable state* of the Earth System as an object of law is a structural problem that hides the most vital factors for human life and prevents the construction of just and equitable solutions.

It is this vision that considers as remaining and *res nullius* everything that does not fit the concept of national sovereignty, which turns us into true *free riders* of the Earth System to which we belong and depend on, opening the doors for a collective tragedy.

3.3. The Greatest Market Failure

While it is true that it is materially or legally impossible to deny any human being free access to use of the Earth System, the enjoyment of truly common goods without any effective rules means that each individual is compelled to indefinitely increase his/her use of common resources associated with a particular state of the Earth System (e.g., the atmosphere with a particular concentration of constituent gases) because, if one does not do it, others will. All users have an incentive to increase their use without concern for the impact their actions may have on others (and perhaps themselves), and a disincentive in promoting the maintenance and improvement of the common good.

This is the well-known tragedy of the commons model described by Hardin (1968), in which free and unregulated use of a common resource based on the logic of *first-come, first-served* results in a rational actor maximizing individual interest. This places the common resource under such pressure that it becomes degraded and eventually exhausted as a result of overexploitation, thus the "tragedy". The dilemma is that if a user retracts his/her use and the others do not, the resource will run out in the same way and the user will have lost the short-term benefit that was obtained by others.

The model is now being reproduced on a global scale, with the difference that the good (resource) was until recently unknown and not definable. In this global-scale model, each state, following its own interest, will not be concerned about limiting pollution or maintaining its ecosystems for the purpose of contributing to a well-functioning Earth System in a stable and accommodating state, as the good is freely available to be exploited by all. As there is no legal status for the global good, everyone uses it as *res nullius*, considering it will provide an endless stream of benefits to everyone, where their use does not reduce the potential for use by others (contrary to what is true of the commons).

Incidentally, this legal black hole has also been identified by economists in the Stern Report:

> *Climate change presents a unique challenge for economics: it is the greatest and widest-ranging market failure ever seen. The economic analysis must therefore be global, deal with long-term horizons, have the economics of risk and uncertainty at centre stage, and examine the possibility of major, non-marginal change. (Stern 2006:11)*

The failure to recognize the existence of the Earth System makes nations unable to cope with the challenges on a planetary scale. One consequence is that all the benefits from, or damages to, the Earth System are legally non-existent. Without the existence of this common good or the identification of what is the good that presents simultaneously beyond and within all states but is required to be maintained in good condition for the functioning of the Earth System as a whole, we will not be able to turn ourselves into stewards of our common home. An Earth System that does not exist is a matricial failure and theoretical gap, which prevents filling the void that this recently recognized scientific reality requires.

3.4. Global Free Riders... Get It While You Can

At the heart of this problem are deep theoretical concepts that require some prior conceptual clarification on the characteristics of property, property rights and underlying relations. Since human relations expanded on a global scale through global systemic financial, economic and political interconnections (but ignored the biogeophysical interconnections that underpin the functioning of the Earth System), it is essential to realize how some of these principles of law led to the overexploitation and consequent tragedy of the commons.

The right of private property confers to its owner the power to *exclusively* use a resource, even if such use is rarely done absolutely. This means that, even though an owner has full power over something *plena in re potestas*, meaning the right to use, enjoy and abuse a thing, *ius utendi, fruendi et abutendi res sua* means that he or she is limited by the rules of society.

Rights to common property are held by groups of individuals, excluding access to the resources for all those outside the group, but considering rights and duties regarding the use and conservation of the resource.

The *open-access* regime (*res nullius*), the concept of ownerless property, is completely non-exclusive, meaning that the access to goods/resources cannot be denied to any individual. In these cases, one cannot identify a group of users or owners because the available benefits flow to all without any, or almost any, duty regarding the use, preservation or maintenance of the resource.

In economic theory, this inability to exclude any individual's use of a good led to the rise of the *free rider* (Samuelson 1954) issue, in which any individual can benefit from a good without contributing to its production. An individual, following self-interest, will not contribute to the costs of the existence and maintenance of a good but will make use of its existence since it is available to everyone. The individual benefits from the principle of non-exclusion.

The problem of the tragedy of commons is based on the characteristics of free access and the unregulated use of a natural resource, which is limited by nature. Climate change is a tragedy of the commons on a global scale, in which this intrinsically common good, which was overexploited (a characteristic stable climate of a well-defined state of the Earth System), is not only difficult to define and to establish boundaries around but also no human being can be excluded from access to it.

In a situation where either the damage or the benefits are common, without an organization of collective use through a system of accounting benefits and harms, everyone will act as a *global free rider.* Therefore, this is a tragedy not of material resource exhaustion but of individual occupation of a certain quantity of the biogeophysical space of the Earth System, carried out through a change that contributes to destabilising the favourable, stable state of the system. In other words, pollution is a contribution to a change of a particular state, the *healthiness of the Earth System*. This new form of occupation does not correspond to the traditional concept of territory or a physical appropriation of tangible resources; rather the new reality must be recognized and conceptualized in order to organize the use of the Earth System. Although a subversive perspective of the dominant view today, the indivisible "whole" makes the issue of management of common goods (i.e., the Earth System) the basic fundamental theoretical question for all discussions on global environmental goods and possible alternative ways of building a sustainable society.

3.5. A Long Looking-For Period

When we look at the pathway traced by science in perspective, the history of environmental civil society movements and all the high-level negotiations that have been taking place for many decades, we realize that along this route of searching for solutions, the vision that the "common" is just the leftovers after appropriation unfortunately continues to be the starting point from which reality is framed. However, a great effort by the victims of this structural failure is being made and it is imperative to continue this standard negotiations track, even accepting that progress in reaching a solution for our troubled planet has been too slow.

Ten years after Rachel Carson published *Silent Spring*, a book that challenged the idea of the supposed capacity of the environment to absorb toxic pollutants such as agriculture pesticides, the 1972 United Nations Conference on Human Environment, held in Stockholm under the leadership of Maurice Strong, is a decisive mark on the sustainability timeline. While the regional pollution situation in Sweden and the surrounding Nordic and Central European countries achieved a particular focus, it was the first major step at the global level to give environmental issues a high priority. The creation of a sustainable development concept, with the view of integrating different fields of development, which until that time had been fully separated into a cohesive vision solving the environmental versus development dilemma, was a clear breakthrough. *Limits to Growth,* by the Club of Rome, the best-selling environmental book, was published in 1972, one year before the oil crisis. The type of analysis, interconnections and particularly the results sent a shockwave through both developed and developing countries. The conference led to the establishment of numerous national environmental protection agencies and, most importantly, the creation of the United Nations Environment Programme (UNEP).

During the 1970s, while relevant international agreements such as the Convention on International Trade in Endangered Species of Flora and Fauna (CITES) in 1975 and the adoption of the Convention on Long-Range Transboundary Air Pollution in 1979 came into effect, the world became acquainted with dramatic global environmental problems, including the discovery of the role chlorofluorocarbons (CFCs) played in damaging the stratospheric ozone layer by Rowland and Molina in 1974, and catastrophes with a

symbolic impact that became calls for world action like the 1978 Amoco Cadiz oil spill affecting the coast of Brittany in France.

The ’80s broadened the scope of international action in different areas of the environment. The first World Conservation Strategy was released by the International Union for Conservation of Nature in 1980 with the significant subtitle: “Living Resource Conservation for Sustainable Development”. In the document’s foreword, it states that “human beings (…) must come to terms with the reality of resource limitation and the carrying capacities of ecosystems, and must take into account the needs of future generations”. At the end, the “Towards Sustainable Development” section identifies the main agents of habitat destruction as poverty, population pressure, social inequity and the terms of trade, and calls for a new international development strategy. While the principles were not disruptive at that time, they started to frame a vision for the next decades concerning the complex relationships between human beings and nature.

The concept of the ‘common heritage of mankind’, first mentioned in a 1954 convention related with the protection of cultural property under armed conflicts and in the Outer Space Treaty of 1967, achieved a greater maturity in 1982 within the United Nations Law of the Sea Treaty.

In 1987, the publication of *Our Common Future*, or the so-called Brundtland Report, gave a comprehensive vision of the problems affecting the planet and the need for global solutions mostly through the promotion of sustainable development.

The United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 was a real breakthrough. By mobilizing an incredibly larger number of stakeholders and high-level representatives from all over the globe before, during, and after the conference, the Earth Summit or ECO/92 framed the United Nations as the unquestionable international core for further advances on the implementation of solutions for a safer planet with a better quality of life. The publication of Agenda 21, the signature of the Convention on Biological Diversity and the Framework Convention on Climate Change, the Rio Declaration plus a statement of non-binding Forest Principles probably turned the event into the most important political mark on the sustainable development timeline. The parallel non-governmental organization Forum also added a set of alternative strategies and visions relevant in the framing of a critical view compared to the less ambitious, slow, and sometimes painful negotiation track along the formal venues of the United Nations.

Throughout the 1990s, two major challenges should be highlighted as crucial steps for a better understanding of the international framework concerning sustainable development and the most important global long-term problem for humanity that is climate change. The beginning of the Conferences of the Parties, after the entry into force of the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 and the further signature of the Kyoto Protocol by 1997, and all the preparatory work for the approval of the United Nations Millennium Development Goals by 2000, where world leaders agreed to a set of time-bound and measurable goals for combating poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women, to be achieved by 2015.

In 2000, after a decade of global cross-cultural dialogue on common goals and shared values, the Earth Charter was launched. It began as a United Nations initiative but it was then developed through the involvement of the global civil society, currently with the endorsement of more than 6,000 organizations. The Earth Charter proposes an ethical framework for building a just, sustainable and peaceful global society for the 21st century. With 16 principles, the Charter emphasises the need to respect and care for the community of life along the first four principles, with a statement (principle 2a) that frames a relationship between humans and the rest of nature: "Accept that with the right to own, manage, and use natural resources comes the duty to prevent environmental harm and to protect the rights of people."

During the first decade of the 21st century, another paradigm should also be noted – the relationship between the intensive work of more than 3,000 experts from the Intergovernmental Panel on Climate Change between science and forecasted policy scenarios, and all the negotiations towards the mitigation and adaptation to climate change, clearly deserving of the Nobel Peace Prize awarded in 2007.

3.6. The Inevitable Global and Multiple Approach

Even admitting that the negotiations pathway will gradually convey better approximations of a solution, the structural problem still exists, making inevitable a confrontation where "sovereignty defies reality" (Brunnée 1998). This author, in a paper about the conflicts between sovereignty and water management and the difficulties of international law in dealing with shared resources, states that

> My contention is simple: International Water Law, and States, will not meet the "challenges of water" until the reality of interdependence is addressed in its full complexity. This means that international environmental law and international water law must become integrated to treat water for what it is: a component of the environment. From this integration, in turn, must emerge a concept of sovereignty that reflects rather than defies environmental reality.

With the knowledge we have today of the Earth System, a division between the water component and the other system components is not sound but the statement is still valid on the need for sovereignty to reflect the environmental reality.

It has become obvious that solutions are necessary. Within the political framework architecture of existing institutions, we must consider that without a new theoretical approach able to support a new global paradigm for the management of the commons within an international landscape characterised by the multiplication of territorial units, it will be impossible to avoid the effects of a congenital degeneration.

In this context, the preliminary works concerning the ecological footprint, a first quantifiable and integrated analysis at a global scale, date from the beginning of the '90s in the last century. It was more recently, in 2006, that the standardization of this instrument has enabled it to evaluate and compare activities, countries and regions worldwide. The ecological footprint enables us to measure the human demand on nature and evaluate the availability of resources in a constrained world that is becoming more and more populated.

The footprint represents both the asset side through biocapacity, the planet's renewable resources such as biologically productive land areas including our forests, pastures, cropland and fisheries, and a demand side, with humanity's consumption of natural resources.

Upon reaching 2015, the target date of the Millennium Development Goals, the United Nations took an important broader step, adopting in this same year the 17 sustainable development goals (SDGs). Considered a consequence of the Rio+20 outcome document "The Future We Want", an inclusive and transparent intergovernmental process on SDGs opened to all stakeholders, with a view to developing global sustainable development goals. Ending poverty and hunger go hand in hand with the need to ensure sustainable consumption and production patterns; take urgent action to combat climate change and its impacts; conserve and promote a sustainable use of the oceans, seas and marine

resources; protect, restore and promote the sustainable use of terrestrial ecosystems; sustainably manage forests; combat desertification; and halt and reverse land degradation and biodiversity loss.

Therefore, and with a deep description of the historical application and usefulness of tracking sustainable development, new guiding principles for assessment system indicators are suggested throughout this book.

However, the ecological footprint does not account for certain key thresholds within our biophysical system, the so-called planetary boundaries (Steffen et al. 2015a; Rockström et al. 2009) that correspond to biogeophysical features of the geological period in the Holocene. This intangible structure that defines the *favourable state* of the Earth System is referred to by the scientific community as the "safe operating space for humanity", a space without territory, a true natural *res incorporales* that is simultaneously inside and outside all sovereignties, that through the cumulative pressure of humanity may drive the Earth System to an undesirable state.

This new known reality, this true environmental *grundnorm*, therefore, should be the basis for any positive law of general acceptance and reasonableness (Rakhyun & Bosselmann 2013). The ULO, *unidentified legal object*, (Melot & Pélisse 2008), could now have a set of parameters and guidelines that define its stability and existence.

While science is key for evaluating the progress towards a more sustainable planet, the daily reality embraces long worldwide negotiations, with thousands of negotiators talking (more than defining) a set of policies on multiple dimensions, including the economy, society, the environment, and other aspects such as governance.

Departing from the "current system of nation-state based governance is inadequate for tackling such issues as climate change-induced global warming, pandemic diseases and other threats to human security and prosperity"[2], this book conveys the idea of an Earth Condominium model, and a new global trusteeship as a paradigm shift necessary to overcome the difficulties the United Nations has had in the last decades to achieve a better and planetary outcome concerning different environmental- related matters. Indeed, the perception of informed citizens worldwide is that the UN has not been able to deliver the necessary commitments, measures and actions to tackle many of the issues agreed on within the sustainable development area. However, it is completely unrealistic to rapidly change the modus operandi of this planetary institution. Even though we are far from the desired goals, one has to recognize that the negotiations have been progressing with some relevant achievements. The alternative to bilateral or group country agreements would

increase the dictatorship of the will of a few countries, extending the already existing unnecessary divisions.

In fact, the high complexity of the climate change issue makes science and technical expertise conveyed through the Intergovernmental Panel on Climate Change almost as determinant as political will.

The extensive accumulation of negotiation knowledge and consensus, including the signature of the Kyoto Protocol in 1997, with all the accessory mechanisms including the clean development mechanism, joint implementation, and emission trading between countries, involved a huge process of approval, tracking, and monitoring that is not common to other UN conventions.

The pathway where long-frozen concepts, such as the so-called "firewall" that has been dividing countries into two major groups – developed and the developing, which have been questioned since greenhouse gas emission targets have had to be applied to a much larger number of countries in the post-2020 era, is a paradigm of crucial importance that the negotiations are trying to finally overcome.

The future has to incorporate a combination of strategies, where champion countries have to lead the way and engage other countries, and where multilateral negotiations have to unfold and at least partially meet the objectives considered necessary for the minimization of impacts on humanity and ecosystems. Simultaneously, a new legal paradigm where the "commons" are the basis of a new configuration of the relationships between the countries is vital, and should be implemented within a medium or long-term perspective in a parallel but active process that should start as soon as possible. A pragmatic perspective would be the one that takes into account the current *real politic* but at the same time acknowledges the huge theoretical challenge to law to convey a favourable state of "*healthiness"* of the Earth System which it is not restricted to the global commons but also spans across areas subject to national jurisdiction (Borg 2007).

A complementary strategy that does not stop or close the ongoing negotiation processes but shifts and integrates them within a new conceptual framework is the challenge embraced by this book. Only a truly accepted agreement can be both binding and implemented and, therefore, successful.

3.7. The Double Tragedy and Double Challenge

The work of Hardin generated pessimism around the "common", turning common property management into a failure. The failure deepens when even those who genuinely care about future sustainability and the common good come to the conclusion that the restriction of exploitation of the resource will lead to a comparative economic loss. This is an altruistic feeling that will lead to a self-elimination of the agents, resulting from a natural selection process. This logic is valid not only for the exploitation of the resource but also applies to the benefits that can be realized in maintaining/improving the common good.

In the context of the Earth System, one can designate the current situation as a dual tragedy:

> On one hand, the classical tragedy of exploitation embodied in the destabilisation of the relatively stable Holocene state of the Earth System by unregulated resource exploitation and pollution;
>
> On the other hand, and using the Roman Source/resource analysis, as no country will enjoy just for itself all the benefits provided from its own sources of the resource (ecological/geophysical infrastructure) in the state of Earth System (common resource), there are no advantages in promoting actions to maintain the Earth System in a stable state. As there is no incentive for individual initiatives to maintain or improve the sources of common good, in the context of competition and legal and economic shortcomings in managing a common resource, it is normal to allow the degradation of the sources to sell raw materials or to obtain other economic gains, since the vital benefits provided by the sources of the common resource are worth zero as they are still shared by all on a global scale.

The logic of the tragedy of the commons is doubly valid for the exhaustion of the *resource* and for the destruction of the *sources of the resource*, "the ecological infrastructure" that can deliver benefits to all societies. The short-term logic will prevail unless structural measures that have the ability to change these initial conditions and generate new systemic collaborative effects are implemented. The logic of the tragedy of the commons undoubtedly depends on a set of assumptions related to the motivation of

people operating under rules governing the use of the common and defining the very nature of the resource.

A pragmatic approach to this dual challenge has to be necessarily innovative. This implies a structural intervention in the framework basics of the sovereign international system, which allows the benefits achieved in the state of the Earth System, which currently economically disappear into a black legal hole, to have economic visibility through an accounting system and compensation for the "stewardship of the Earth System". For this structural change to become possible, it is necessary that the global benefits made by the "common resource", which is the Earth System in a favourable state, are caught in a global legal instrument.

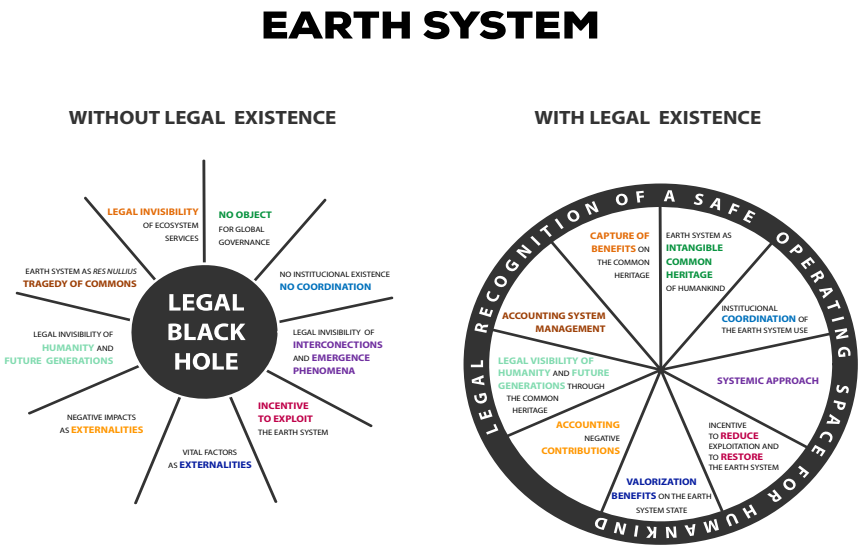


Figure 4. A comparison of the existing and proposed Earth System management regimes

With the work of Elinor Ostrom and the recognition of the Nobel Prize awarded to her, the commons are no longer an impossibility. For Ostrom (2010:28) "the crucial factor will be a combination of structural features that lead many involved to trust each other, and are willing to take joint action that adds value to their own short-term costs because both see a long-term benefit for themselves and others, believing that most others will comply". This building of trust and reciprocity, as she claims, requires structural features. We argue that the first structural feature in organizing the collective use of a common resource is to define the resource to be managed, and to recognize that it has to exist.

Once identified, the natural *res incorporales* state of the Earth System, although physically inappropriable can be managed. Hugo Grotius (1916) however defends an exception: If any part of these things is by nature susceptible of occupation, it may become the property of the one who occupies it but only in so far as such occupation does not affect its common use.

Ostrom (2010:36) also acknowledged that "it is obviously much easier to build solutions for collective action problems related to small-scale resources than for those related to a global common good." Despite the magnitude of the challenge, there is no other feasible alternative. This is the approach that we will explore throughout this book.

Chapter 4

A New Object of Law – Attempt for a Legal Construction

> Let's not pretend that things will change if we keep doing the same things. A crisis can be a real blessing to any person, to any nation. For all crises bring progress. Creativity is born from anguish, just like the day is born from the dark night. It's in crisis that inventiveness is born, as well as discoveries are made and big strategies are created. He who overcomes crisis, overcomes himself, without getting overcome. He who blames his failure on a crisis neglects his own talent and is more interested in problems than in solutions. Incompetence is the true crisis. The greatest inconvenience of people and nations is the laziness with which they attempt to find the solutions to their problems. There's no challenge without a crisis. Without challenges, life becomes a routine, a slow agony. There's no merit without crisis. It's in the crisis where we can show the very best in us. Without a crisis, any wind becomes a tender touch. To speak about a crisis is to promote it. Not to speak about it is to exalt conformism. Let us work hard instead. Let us stop, once and for all, the menacing crisis that represents the tragedy of not being willing to overcome it.
>
> Albert Einstein

4.1. A Theoretical Gap

According to Nietzsche, "There are no facts, only interpretations". This means that knowledge of facts is no substitute for their comprehension.

The exponential increase in the knowledge about the Earth System does not necessarily mean we understand it in all its dimensions, particularly in terms of all the consequences this new reality entails. Still, albeit somewhat unconsciously, the increasing ability to intervene and change the state of the Earth System as a whole is moving us from the role of passive spectators towards actors capable of changing the plot itself. We are now in the driving seat (Rockström 2014), but it seems that despite having access to the command centre, we don't have a social organization to define who and how to use the "central computer" (Matos 2016:28) that would allow us to conduct our own behaviour in respect of Spaceship Earth (Fuller 1969).

If from a technological perspective we are able to overcome and manipulate Spaceship Earth at all levels, the crew doesn't have the internal organization that allows collective

action to handle its operation. We have never been so vulnerable with respect to the level of social organization.

In nature, where more remains hidden than is revealed, the unexplainable "whole" that surrounds us has been delineated by sets of rites, myths, beliefs and concepts that established order amongst ideas and name the unnameable: *Mother Nature, Mother Earth, the Great Machine, goddess Gaia, the law of nature, living space, ecological space, life-support system.* They are all forms for what we today call the Earth System.

Throughout the history of science, properties and behaviours of different components of the Earth System have been analysed on different physical, material and biological levels. However, the higher, more intangible and diffuse levels of interconnection and global systemic integration remained in our mental sphere, hidden as the true *terra incognita*. Even if laboratory analyses allow us to interpret the unseen and incorporeal character of natural phenomena, a problem arises with the attempt to comprehend them on a global scale, integrated within the true system, the "whole". For example, carbon dioxide (CO_2) and its role in the biochemical process of photosynthesis are well known, but its effects at higher concentrations in the atmosphere and the consequences of its interaction with other elements were perceived only recently. Neither the "global" nor the "whole" fit in any laboratory or suit the process of delimitation and precision required by legal norms.

First, human activity operates at the lower level of the Earth System (material, physical, biological), that is, at the level of exploitation of resources and ecological infrastructure. It not only disturbs the dynamics and interdependencies at the level of activity but also at a higher level of the Earth System, provoking chemical changes in the atmosphere and hydrosphere, initiating a process of manipulation of the pattern of order. So, for the first time, anthropogenic impacts affected the Earth System as a whole, regardless of whether they happened at only the lower level of the Earth System. The unified and interdependent character, and the properties of the global system, began to unravel through the feedback from the higher levels of integration of the Earth System. That initiated an interpretation of the laws of the "whole" which could not be understood from the behaviour of its components only.

> In fact, the 'whole' is organized from the molecule up to the biosphere, and at each level of integration, characteristics emerge which cannot be analysed based only on mechanisms that explain lower levels of integration. This phenomenon, known as

> *emergence*, corresponds to the appearance of new characteristics at combined levels and which do not exist at the level of its constituting elements. (Filipe, Coelho & Ferreira 2007:125)

The characteristic behaviour of the whole cannot be derived, even in theory, from the most complete possible knowledge of the behaviour of its components, whether considered individually or in other combined proportions or organizations.

> *Emergence* can also be seen as a *process* in which "spontaneous" order is displayed from within the system. It is when different elements are allowed to combine, that they form patterns and interactions between them. When they lose their established rational order, entering into a situation of unstructured chaos, a new structure may emerge. (Miller & Swinney 2001:22)

The Earth System is a complex one within which there are different levels of functioning and interaction. The pattern resulting from millennia of slow interactions between the various components of the Earth System produced a biochemical structure corresponding to a single period of climate stability: the Holocene. This spontaneous *emergence* of an order produced emergent phenomena that contributed equally to the consolidation of that pattern of a well-buffered stability that works inside an "envelope of natural variability" (Steffen et al. 2004:336). These reciprocal interactions of teleconnections, retroactions and feedbacks led to a complex and dialectical system, which resulted in a favourable condition for the development of human civilizations.

The number of such phenomena is immense, and only by an analysis of the interconnections on a global scale can we begin to lift the veil of their incredible complexity. One of the most interesting phenomena, in that by its domino effect it could be a determining factor in maintaining the current state of the Earth System, is the transport of dust between the Sahara and Amazon (NASA & Garner 2015). From the Sahara desert and, with more intensity, the Bodélé Depression in Chad, an ancient lake rockbed composed of dead microorganisms loaded with phosphorus, around 182 million tons (the equivalent of 689,290 semi-trucks full) of dust are transported each year by the wind, travelling 1,600 miles across the Atlantic, though some drops to the surface or is flushed from the sky by rain.

Near the eastern coast of South America, at longitude 35W, 132 million tons remain in the air, and 27.7 million tons (enough to fill 104,908 semi-trucks) fall to the surface

over the Amazon basin. It fertilises the basin decisively, maintaining that dense green mass, which, in turn, with its 600 billion trees and an extraordinary sophisticated process, pumps 20 billion tons of water daily into the atmosphere (larger trees pump about 1000 litres/day of water), and injects 17 billion cubic metres of water containing a high concentration of organic matter into the ocean (one-fifth of all the fresh water that reaches the oceans). Amazingly, deserts are crucial to life in the oceans and global climate regulation. With this dialectic chain of emergences, we realize the interdependent whole of the entire system. In its higher level of integration, as stated by Hongbin Yu,[5] "This is a small world ··· we're all connected together".

Only recently has visualizing this example become possible, allowing us to comprehend the unimaginable potential chain of interconnections and teleconnections on which we depend, and that we are influencing by inducing changes in the preconditions that maintain the status of the system.

The changes in some of the initial conditions in the pattern of stability in the system corresponding with the Holocene period, for example the increase in CO_2 concentrations (and consequent changes in heat accumulation, global thermodynamics and feedbacks produced by climate change), allowed us to "open the book" on the dynamics and interdependencies that occur at the higher level of the Earth System.

The Great Acceleration[3] by the human enterprise started in the middle of the twentieth century with an increase in the exploitation of resources and ecological infrastructures – "The speeding up of just about everything after the Second World War … sometimes called the Great Acceleration… human population has tripled, but the global economy and material consumption have grown many times faster" (Hibbard et al. 2006:342). It created such fundamental changes in the state and functioning of the Earth System that it is designated as the end date for the Holocene period and the start date for the Anthropocene.

The *tsunami* caused by the changes in the dynamic natural pattern is overwhelming the social and economic systems to such an extent that it calls for a questioning and re-evaluation of many of the fundamental ideas upon which the Great Acceleration was built. Although urgent, we have not yet been able to go the required distance from which to

[5] Hongbin Yu, an atmospheric scientist at the University of Maryland who works at NASA's Goddard Space Flight Center in Greenbelt, Maryland, is lead author of the study about dust transport, with data collected by a lidar instrument on NASA's Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation, or CALIPSO, satellite from 2007 through 2013.

perform a critical analysis of these facts, their scientific interpretation, and their implications for international relations and the social, political and economic realms.

Although restricted to an academic level, the discussion on the de-territorialised and globalised reality in which we now live has created a situation in which everything is being questioned. Garcia (2010:15), in her analysis about the fragmentation of the state sovereignty, identified many authors who address this issue:

> *There are authors who question whether we need to abandon the concept of the State (Heiko Faber), those that claim that the Modern State has ceased to exist (Wolfgang Reinhold), those who ask "why do we still talk of the State?" (Peter Saladin), or those who claim that there is an incompatibility between globalisation and sovereign States (Thomas Vesting). There are even those who assert that the national State no longer guarantees peace, freedom, security, protection of human rights and the environment (Julianne Kokott).*

Ruggie (1993:139) argues that scholars of international relations are not very good ... at studying the possibility of fundamental discontinuity in the international system; that is, at addressing the question of whether the modern system of States may be yielding in some instances to post-modern forms of congaing political space. We lack even an adequate vocabulary; and what we cannot describe, we cannot explain.

In a fully globalised world, connected through biophysical interactions between people and nations at social and economic levels, several fundamental premises of the Westphalian system of sovereign states have changed. The change is so deep that even words, until today unquestionable in the description of these situations, such as the word "international", have become obsolete in the attempt to capture the totality of social relations that cross the boundaries of states.

The growing importance of non-State actors involved in social interactions beyond State boundaries, regional and global structures, and the improvement in the efficiency of international norms, resulted in terms such as "transnationalism" and "globalism". These new terms are responses to the inadequacy of the term 'international' to depict observed empirical phenomena, making the 'international' an unsatisfactory analytical (or indeed epistemological) category to describe global society. Thus understood, the 'international' might be seen as a description of social structures that have lost much of their relevance in the wake of increasing de-nationalisation through trans-nationalisation or globalisation. (Albert 2007:48)

Disturbances we create in the pattern of Holocene stability, combined with the new technologies available, make visible the higher level of integration of the Earth System. The awareness of this new reality and the knowledge of the consequences created the new globalised context, where everything changes. It is even normal to resort to "problem words" (Morin 2007) and not "solution words", as in the case of the word "complexity". In this sense, several authors resort to "complex sovereignty" (Magalhães 2007:88; Pauly & Grande 2007:3) to define what otherwise could not be named in the confrontation between evolution of social-ecological reality and the concept of sovereignty.

Edgar Morin (1990:8) explains in his "complex thought" that "complexity cannot be reduced to a single master word, law or simple idea. In other words, the complex cannot be reduced to a law or idea of complexity. It cannot be something easy to define, thereby taking the place of simplicity". In other words, calling complexity "complex" does not solve the problem with which we are confronted.

Even on the short human temporal scale, the Great Acceleration was short and recent. Its feedbacks carry with them impertinent and subversive questions that pressure the existing social system and its assumptions. Answering them implies a radical change in theoretical perspectives.

The facts exist: the Earth System functions as an interdependent "global whole" in the way it has always functioned in its different states throughout its history – what does not yet exist is a theory able to first represent the world beyond the nation-state and then allocate a *place* to what is the higher level of integration of the Earth System. Since there is no interpretation capable of representing this global reality within our system of social organization, we continue to act as if that reality does not exist.

Nietzsche, therefore, is correct in his statement, the point here being that the legitimacy of interpretation lies in its capacity to explain reality; in other words, its ability to reflect and understand the actual situation in the world. The legitimacy of a discourse resides in the explanatory power of reality, so that legitimacy erodes to the extent that its inadequacy to reflect the real situation in the world increases. In every area where the discourse of sovereignty has lost its ability to accurately portray the facts, it is precisely at the gap between theorization of reality and the actual reality of the ecological dynamic of the biosphere that this loss of legitimacy becomes clear (Camilleri and Falk 1992).

Without a theory able to interpret the facts raised by the global and interdependent reality of the Earth System, we will continue to live an illusion that tries to fit new facts into an old interpretation.

In this context, it is no surprise that the majority of reactions to environmental disruption caused by the Great Acceleration are limited to interventions in the periphery of the social system. We classified this "looking-for period" as the first generation of environmental law, with modest intervention in human relationships, that is, we relied on long lists of prohibitions without intervening in the primary drivers of the system or properly understanding the huge theoretical challenge.

Even without the scientific information needed to unravel some of the contours of the new circumstances that impose themselves on law, Amaral (1994:17) understood the structural and systemic nature of the challenge being faced.

> *Environmental law is a primary branch of law, born not to regulate the relations amongst humans but to try to insert discipline in the relationship between humans and nature. ... before the eyes of humanity, a new era has been unravelling, we may actually even be entering into a new civilization. ... It is why this new civilization has begun to generate its Law – a new type of Law. Environmental Law is not just another specialised and technical branch, but requires a whole new philosophy that shapes the way we look at Law.*

4.2. The Legal Nebula

Defining the outlines of reality upon which to build environmental law is conditioned by the possibility of knowing *what is to be protected*; in other words, by the ability to define and delimit the *quid* to be put under the scope (protection) of the law.

The transmutation of the "environment" from a slightly relevant social interest into an authentic legal good, with a value *per se*, added a profound new meaning: The "environment" shall be protected as a value by itself, and not as it was previously – that is, merely the causal path of damage.

Previously, for law, damage to the environment only existed when it caused damage to people or goods. With the new formulation, damage is perceived as disturbance of an autonomous and unitary legal interest it allows, immediately, to draw – based on axiological ordering of the subject of injury – the distinction between damage to the environment as a legal good [ecological damage] and the damage caused to people and

property by environmental disturbances (environmental damage, *Umweltschäden*, *Milieuschäden*). (Cunhal 2002:40)

The autonomy of the environment as a legal good, with a value *per se*, is one of the major conceptual achievements made along the path of legal protection for the environment. Despite several national and international legal systems adopting this recognition, during this *looking-for* period, there was no scientific knowledge available that would enable us to understand the facts, the *quid*, with which jurists were faced. This lack of knowledge and the impossibility of defining the environmental good within existing paradigms made these new questions impertinent. "*The subversive impulse of environmental law*" was what Canotilho (2009:2) called this structural incompatibility. In our view, the subversion of law by the environment is based on three fundamental scale preconditions:

- The global scale of the good intended to be captured under the scope of law, and the impossibility of establishing any kind of material or abstract legal division of the "environmental good" (geographic scale);
- The cumulative and intergenerational character of the damages on and benefits caused by this "environmental good" (time scale);
- The restrictive and limiting approach of environmental law towards an economic system conceived on unlimited growth on a planet with limited resources (economic/ecological scale).

On the way to representing the environment as a legal good, states found they needed to capture and create a narrative able to interpret something that had always had a local and a global dimension, diffuse and indeterminate. Some states searched the "whole" within their own boundaries and eventually arrived at the understanding of the *unitary character* of the environment. Departing from the principle of territoriality of norms and political power, it appears that this unitary character referred to a national context, even though there was already an empirical perception that this unit referred in fact to the larger *whole*, the global. But due to a lack of legal representation of the true scale of the legal good in question, the "environment" had to adapt itself to political borders.

The attempt to define the global on a local scale quickly became ineffective. In the National Environmental Performance Report on Planetary Boundaries of the Swedish Environmental Protection Agency (Nykvist, Persson, Moberg, Persson, Cornell, &

Rockström 2013:3), it is stated that "Sweden is exposed to environmental impacts from other countries which affect Sweden's ability to achieve these environmental quality objectives. At the same time, Swedish consumption and production have an impact on environmental performance in other countries". International organizations such as the EU do recognize this global dependency: "Even though we have never used our natural resources with so much efficiency as we do at present, we are still degrading our essential resources ... in Europe as well as in the rest of the world, and in the environmental field, borders do not exist" (SOER 2015).

These structural genetic defects gave rise to a process of relativism and de-legitimization of the legal good. The result was a dysfunctional congenital degeneration:

a) the legal weight of "ecological footprints turned out to be unsupportable by the *jus utendi, fruendi et abutendi* of property and sovereignty (Canotilho 2009:2);

b) the cumulative character and global spread of harm over the course of various generations, and protection of rights without subjects (namely future generations);

c) the causal link between the acts that harm the systemic character of the environmental damage and affect all the Earth System, whose effects only reveal themselves much later;

d) the global dispersion of benefits of ecosystem services;

e) the idea of polygonal relations extended to a global scale, within a context of plural responsibility;

f) the *tipping points* resulting from the accumulation of damage caused over the course of various generations;

g) *interconnections* between different territorial components divided by abstract political frontiers;

h) the imposition of limits and environmental obligations as generators of unequal competing conditions on a global scale; and

i) the legitimacy problem of instituting legal proceedings, civil society or class actions.

All things considered, there was more than enough reason to reject this first-generation branch of environmental law. Incompatibility with the assumptions of the system gave rise to a phenomenon which is referred to in specialised literature as *Vollzug Defizit,* the implementation deficit (Hucke & Wollmann 1998), or *enforcement deficit*. It came to characterise environmental law due to a) an exponential proliferation of norms and standards; b) the manipulated application with intent to restrict its scope; c) the systemic deferral while awaiting regulation; and d) outright failure to apply norms. Prieur (187:320) considered it a "diffuse form of deregulation" while Charbonneau (1998) speaks of a de-legitimization of environmental law and Carbonnier raises the hypothesis of No-Law.

But as paradoxical as it may seem, even when rejected, this *quid* referent to a *healthiness environment* did in fact invoke a qualitative change in the fundamental goals of states. That is so because it did not cease to represent a value superior to those the law aims to protect, both from an individual or collective point of view.

This deep material foundation, as a vital dimension of life and the human species, is not just a constitutionally guaranteed right in about 125 constitutions (Bosselmann 2016:72); it is even being considered a hypothesis that would lead to the emergence of a new type of state, a *post-social state* (Silva 1989), or a successor to the *welfare state*, an *environmental law* state (Rangel 1994).

The entry of the environment into the *core* fundamental objectives and tasks of the states as a collective legal good and/or fundamental right of each individual citizen also raised procedural questions of legitimacy in court or when participating in administrative procedures.

Various states (mainly Portuguese-speaking countries), challenged by a reality not reflected in their spatial dimension, sought to develop a theory through "problem words" that were better able to portray the diluted and diffuse reality that conditioned them. The "theory of diffuse interests" at the basis of *class action* (in Portuguese *Ação Popular)* teaches us that when legal goods are involved, such as the environment, consumption or quality of life, "they belong to all of us and can never be allocated exclusively to any subject. It means that the diffuse interests include at the same time a collective and individual dimension, neither being merely collective, nor merely individual" (Sousa

1998). Cappelletti (1975) expresses the other side of the coin: they belong "to everyone and no one".

But the all-encompassing scale of *diffuse interests*, once again, cannot be limited to a single community belonging to a particular state but only to humanity as a collective in the trans-spatial dimension, such as "the entire human race, being the combination of all human beings that inhabit the planet" (Santos 200:68), and in a trans-temporal dimension, in the sense of the collective *ad infinitum*, including all human beings that will succeed the current living generation at a given time (Malhotra 1998:41). Each generation thus becomes "a link in an endless chain of generations that collectively forms a community, a human family" (Agius 1998:7). This has led to a doctrine that defends the emergence of a new subject in international law: humanity; a true *"revolution in social and legal thought"* (Agius 1998:7).

The combination of the "whole" and "everyone" may be the biggest challenge that the law will face in this century. The uncertainty exists not only around the good intended to come under the law's protection but also around the identification of the holders of this diffuse good, therefore the nebula broadens to the international dimension.

The UN General Assembly Resolution 43/53 Protection of Global Climate for Present and Future Generations of Mankind of 6 December, 1988, with a combination of lack of political will and an absence of suitable concepts to define a fundamental resource, state that "climate change on Earth and its adverse effects are a common concern of mankind". This solution has roots in concepts such as *common interest, global commons, intergenerational equity, responsibility or rights, common ecological heritage of humankind, life-support system and "the awareness that the problems of ocean space are closely interrelated and need to be considered as a whole*" (UNCLOS 1982)[6]. They all share the difficulty of defining their form in a precise manner.

So we arrive at a point where all contradictions and paradoxes of the legal nebula are possible, especially when "problem words" blend into "concern words" through indeterminate, merely descriptive, neutral and open concepts. It can easily lead to the "whole" being synonymous for nothing and nobody. "International law itself was (and to a certain extent remains) ill-equipped to address state activities affecting negatively an intangible natural resource which spans across and beyond the national territories of states" (Borg 2009:1).

4.3. The “Whole” Problem

The reality of the “whole” disappears in the political map of state boundaries. However, if the “whole” exists in a higher level of functioning and integration of the Earth System, is it or is it not possible to represent this new reality beyond the states?

Starting from the first two elements that gave rise to structural incompatibility, geographic scale and time scale, which carried with them the subversion introduced into the law by the "environment", and recent developments in our knowledge on the functioning of the Earth System, we will work on a possible evolution of these still embryonic and inefficient formulations of *legal concerns* from an actual vague and indeterminate formula into an operational legal instrument, giving shape to rights and duties.

Expressions such as “*life-sustaining systems of the biosphere”* (United Nations 1992)*, “conservation of climate as part of the common heritage of mankind”* (United Nations 1988)*,* or that *“the problems of the ocean space are closely interrelated and need to be considered as a whole”* (UNCLOS 1982) presented in different texts of international law are themselves attempts to approach the biogeophysical foundations at the basis of the emergence of life and the conditions that allowed the development of human civilization. It is clear that these merely descriptive concepts are not rooted in a set of criteria that offer the possibility of measurement or delimitation that would allow us to define a legal object; that is, to define the *concept and its amplitude*, distinguishing it for all other legal goods but also matching the unitary global reality of the “environment”.

The word *system* in the term *life-sustaining systems of the biosphere* points back to the empirical idea of a combination of various interrelated and interacting components, out of which emerges a whole that is more than the sum of its components. However, this reference to general concepts, without proceeding to a description of criteria that could be used to delimit a physical space in which the system operates or the mention of an indicator that provides us with information on the system state, once again reveals how unspecified concepts rule the environmental nebula.

The phrase *conservation of climate as part of the common heritage of mankind*, although referring to the initial proposal of the Maltese initiative and is included as such in the text of this resolution of the UN General Assembly, does not refer to a specific and

particular good but rather to a set of interconnected goods that shape a system with a specific functionality inherited from Mother Nature. This heritage is the integration of the geophysical properties of the planet with the living biosphere that forms a single global system as the result of an evolutionary process of interaction.

Even the expression *whole* carries with it a systemic idea. It means that, as in the preamble of UNCLOS (1982)[7] where the necessity to manage "ocean space" is recognized, it refers not to the geographical and political space made up by the sum of the different areas of state jurisdiction and high seas but rather to the necessity to elaborate on problems related to the use of the oceans as a whole, taking into account the *ocean environment as an integrated fluid ecological system*. Though still empirical in nature, the perception exists that all these concepts direct us towards the notion of a *system*. The question of how we can build a legal concept relating to a system not tied to any territorial delimitation, since in environmental matters the system is global, remains unanswered.

What are these *life-sustaining systems of the biosphere*, the biosphere being an object that is not confined to any sovereignty, existing both in and outside all sovereignties? We can all perceive it intuitively but we cannot touch or appropriate it, even though it is profoundly related to and dependent on the physical nature placed under the jurisdiction of the different states of the planet. What is *ocean space as a whole,* which apparently transcends every sea, ocean or jurisdiction but does not materialize in a geographical dimension? What is this *natural heritage* that belongs to the time *continuum* of all successive generations, carrying with it interests shared with the unborn, and which should not be mixed with the territorial space that belongs to the people amongst whom they will be born?

The first jump into the unknown will focus on both the dysfunctional relationship between the reductionist physicist or biological approach of law towards nature and the intangible geophysical realities that determine the state and functioning of the Earth System.

It seems to us that the key to establishing order in our interpretation, as we construct legal abstractions in regard to nature, lies in the recognition of different analytical levels. As Soromenho-Marques (2006:57) observes in relation to the immaterial heritage, "it also matters here to avoid reductionism of a physicist or biological nature, we should today avoid the repetition of an old debate that ran through the 17th and 18th centuries on the

nature of matter, as the Newtonian theory of the Universe was presented. During this period, the Cartesians rejected the theory of gravitational force as they considered it "miraculous". For them, the category of material force should always be characterised by direct transmission through physical contact. We cannot make the same mistake concerning the heritage. In fact there exist other types of heritage beyond those that can be seen or touched."

In this search for the environmental legal good, the law has already had to face realities that go beyond our sensory capacity and had the necessity to broaden to the notion of system and ecosystem functions, which have already been recognized in some legal orders, particularly the European Union (Comissão Europeia, 2000). Although these evolutions are attempts to theorize reality and produce a more adequate representation of the systemic character of environmental goods, we do not yet have a concept able to represent the true scale of these biogeophysical interconnections that extended human relations on a global scale.

We find ourselves in a stalemate. On one hand, if we advance with the search for this environmental legal good within the geographical limits of states, we obtain an *ecological nonsense,*[5] inevitably amputated and dysfunctional. On the other hand, if we approach the Earth System on its true scale of biogeophysical relationships, we will collide with the geographic delimitation of sovereignties and the lack of the political and legal existence of the entire Earth System, and therefore arrive at a completely dysfunctional relationship between the Earth System and the social system.

The awareness of the different internal dynamic levels of the Earth System and its dependence on the *core drivers* at the origin of a *structural pattern* that produced a unique period of climatic stability in the history of the planet (the Holocene) could determine the name and define what kind of environmental legal good we are looking for. It is so that the possibility to accurately represent facts and reconstitute, legitimize and thereby make sovereignty evolve, as has happened along the course of history, will only become viable if we cease to hide the reality of these intangible relations.

> *The intangible heritage contributes to the understanding of the critical crossroads of contemporary humanity, shedding light on the human condition, and on some of the possible paths for their redemption. (Soromenho-Marques 2006:62)*

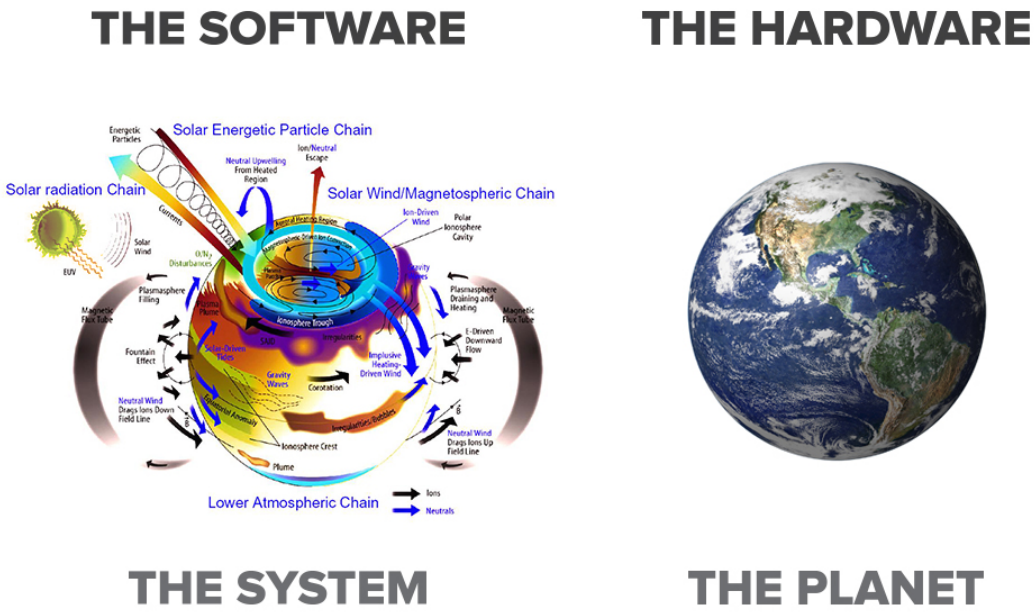
4.4. The Software/Hardware Relation

Defining and delimiting the *quid* to be placed under the scope of law will require the construction of legal abstractions in accordance with the known reality of nature, and finding solutions that harmonise representations of nature with those of the social system.

The fact that the planet, as opposed to many others, is not just a sphere of rocks and an atmosphere offers us a solid point of departure for our reflection. Our planet, orbiting around the sun at a distance of 149 million kilometres in an orbit called the habitable zone,[6] created the necessary physical conditions for an active water cycle to exist, which includes the three – solid, liquid and gaseous – phases. This water cycle enabled the development of an incredibly complex biosphere, forming patterns of organization and global integration through combined internal interaction. Together these patterns form a meta-system.

The need to understand this global reality led to an evolution in life sciences, which integrated different areas of scientific knowledge, creating a contrast with the reductionist tendencies of the Cartesian perspective. This process eventually resulted in the concept of the Earth System that came to mean "the suite of interacting physical, chemical, and biological global-scale cycles (often called biogeochemical cycles) and energy fluxes which provide the conditions necessary for life on the planet" (Oldfield & Steffen 2004:7).

Being in dialectical interaction with the biotic and abiotic infrastructures, these processes function as a set of intangible operational instructions with properties that determine the ways in which the Earth System self-organizes and regulates itself, and can be designated as the "programme" of the Earth System. In a brilliant theoretical analogy, Soromenho-Marques (2006:59) clarifies the relationship between tangible and intangible heritage: "I believe that in an ultramodern analogy, we can read this relationship in the same way that *software* and *hardware* relate to each other." This analogy could in fact be equally valid on revealing the relation between tangible infrastructure (*res corporals*) of the planet and the intangible system (*res incorporales*) of physical laws, thermodynamics or biochemistry, forming in their combination an authentic piece of software containing the operational instructions that determine the functioning state of the Earth System.



Link: http://www.nasa.gov/mission_pages/sunearth/multimedia/itm-processes.html (edited image) | http://farm6.staticflickr.com/5147/5679642871_9d3a2b6072_z.jpg (edited image)

Figure 5. The hardware/software relation and the Earth System/planet relation

The Earth System is a very real and constant presence in our lives. However, since we cannot see or touch it, it was thought to be infinitely abstract, but, recently, technological evolution easily made it visual through images captured from space. It thus became an open book that has since dazzled us with its high degree of interaction.

The feedback we are getting on the state of the system and current technological developments are allowing us to read this "book of instructions" across different scientific areas. "For the first time in history, humans have knowledge at their disposal to exert a power over nature, over life and death, allowing us to gain control over what would previously escape our reach, being considered a certain fatality or causal chain of events" (Silva 2002:10).

At the same time, this potential opened up a new field of opportunities and dangers. In the case of genetic information, the law was called upon to intervene, imposing rules and limits to human-making (bio-law), and information of the human genome was considered the heritage of mankind, even though in symbolic meaning only (UNESCO 1997).

The previous example shows that the recognition of objects of intangible or immaterial character is not new to legal sciences. Other examples are cultural heritage, recognized

through UNESCO's Intangible Cultural Heritage (UNESCO 2003), the intangible value of companies in commercial law and the intellectual property rights and authorship through statements that establish the independence between author's rights and the material support of a work. Despite problems of definition and delimitation, the importance of the values intended to be protected have always justified the search for new solutions.

According to Olfield and Steffen (2004:7), the Earth System consists of an interactive atmosphere, ocean, biosphere, cryosphere, and lithosphere that form together a complete and unified system with characteristics defined as follows.

> It deals with a materially closed system that has a primary external energy source, the sun.

- The major dynamic components of the Earth System are a suite of interlinked physical, chemical and biological processes that cycle (transport and transform) materials and energy in complex dynamic ways within the System. The forcings and feedbacks within the System are at least as important to the functioning of the System as are the external drivers.

- Biological/ecological processes are an integral part of the functioning of the Earth System, and not just the recipients of changes in the dynamics of a chemical system. Living organisms are active participants, not simply passive respondents. Human beings, their societies and their activities are an integral component of the Earth System, and are not outside forces perturbing an otherwise natural system. There are many modes of natural variability and instabilities within the System as well as anthropologically driven changes. By definition, both types of variability are part of the dynamics of the Earth System. They are often impossible to separate completely and they interact in complex and sometimes mutually reinforcing ways.

- Time scales considered in Earth System science vary according to the questions being asked. Many global environmental change issues consider time scales of decades to a century or two. However, a basic understanding of Earth System dynamics demands consideration of much longer time scales in order to capture longer-term variability of the System, to understand the fundamental dynamics of the System, and to place into context the current suite of rapid global-scale

changes occurring within the System. Thus environmental and prognostic modelling approaches are both central to Earth System science.

Now, as we examine this definition of the Earth System and the enumeration of its characteristics from the perspective of law, it seems that many of the problems associated the definition of legal environmental objects at state level have their origin within these characteristics. The same difficulties are faced by international law. These difficulties converge in the first two preconditions (geographic scale and time scale) that motivate the subversive character of environmental law, as follows:

- At the state level, the environment was understood as "an autonomous and unitary legal good". As such, it became a synonym for diffuse and indefinable, thus rendering the protection of this good dysfunctional;
- At the international level, the compartmentalised approach that considered and analysed only the distinct components of the Earth System concealed phenomena of interaction and emergence.

The dysfunction between the current knowledge of the Earth System and the law finds support in the post-2015 Development Agenda of the United Nations, and within the formulation of the sustainable development goals (SDG). This UN strategy puts an emphasis on “the need for a coherent global framework to integrate existing laws that would cover these international areas” (UN, 2013). While international treaties and conventions relative to global common goods do exist, the United Nations recognizes that “the frameworks are fractured, and not comprehensive enough to include modern conservation principles or assessments” (Olfield & Steffen 2004:7).

4.5. A Space Without Territory

The concept or the most adequate international law term (Shelton 2009) to describe the characteristics outlined by Olfield and Steffen from a legal perspective is the common concern of humankind (CCH), which emerged with regard to the climate in the UNGA 43/53 (1988) resolution (http://www.un.org/documents/ga/res/43/a43r053.htm). While this concept is still just a phrase or term that should be understood in a broad sense,

therefore being inapt to serve as operational or normative support for an international environment regime, Dina Shelton knew to appreciate the notable innovation of this term and the profound implications of its premises. According to Shelton (2009), the concept introduces two fundamental innovations into international law: the first relates to the fact that this concept does not make any reference to states; the second being the absence of any reference to a geographically delimited area, even though it is associated with other concepts such as the global commons areas – the high seas, Antarctica, the seabed and outer space – where the common heritage of mankind is applied. "Common concerns are different because they are not spatial, belonging to a specific area, but can occur within or outside sovereign territory" (Shelton 2009).

In the opening speech of the second meeting of the Group of Legal Experts to examine the concept of the *common concern of mankind* in relation to global environmental issues in Geneva 1991, Mostafa K. Tolba, the director of UNEP at that time, asserted:

> *It is very important that the concept of common concern of mankind is further elaborated to make its contents and scope understandable and clear; it is also important to make sure how this concept can be interpreted in the terms of rights and obligations of States in the process of its implementation. It is understandable that, since it is a new concept in international law and international relations, it will develop further in the near future and its interpretation given today, will evolve.*

With these statements, the central idea of this concept – that its birth is only its own evolution– is retained. It was born as a quasi-concept, as a future project, a proclamation of the need to find an idea for an unsolved problem. In other words, since its appearance, the common concern is valuable for the novelty it was, and for what it might still be and represent. It is certain about 30 years on that the UN resolution on the common concern was the way round a possible legal status for the unique nature of climate which is not restricted to the global commons but spans also across areas subject to national jurisdiction (Borg 2007). The climate continues to be orphaned not of a definition but of a legal framework for its existence. In the report of this meeting (UNEP Secretariat, 1991), it was said:

> *During the general discussion on the concept of common concern of mankind, the experts reiterated that the concept still has no legal consequences in terms of rights and duties. It was stressed that the concept should not infringe the sovereign right*

of States and, in this context, a point was raised whether it is desirable to narrow down the scope of the concept and its application and confine it to global environmental issues which may cause significant adverse effects upon the environment. It was re-emphasized that the common concern concept was not meant to substitute the concept of common heritage. There was a general understanding that at the current stage the common concern of mankind may serve as guiding principle rather than legal rule.

He identified the following aspects of the concept of common concern of mankind that require further consideration and elaboration by legal experts:

- Possible implications of the concept for specific obligations in the relevant international treaties;

- Implication for the human right to a healthy environment;

-Implication with respect to the issues of equitable burden sharing and fair compensation.

Although it is made clear here that the CCH (common concern of humankind) was not intended to replace the CHM, the need for this statement and its reinforcement justifies and substantiates the deep connection between the two concepts and their common origin. By listing the issues that need further consideration, we consider that there is a common denominator among the original objectives of the CHM and the future project implementation of CCH.

Both concepts are the result of the same initial boost of looking for an international management regime with the goal of long-term environmental protection through new structures of politics and governance beyond states, without infringing the sovereign rights of states. For all purposes, the CCH is an embryonic form of the non-territorial dimension of the CHM that never came into being, although that was the motivation and source of the initial boost. In this sense, the CCH represents a latent new legal theory, a united and interdependent global reality seeking its roots in the ancient moral or ethical concepts that unify humanity in the nature of the planet it inhabits.

But, unlike the CHM, which still had some "specific areas of the Earth", remnants of the geographical divisions, to anchor its existence, the global nature and *res incorporales* character of the CCH led to a permanently postponed future. This lack of definition and

evolution *sine die* is matched only by the initial project of Arvid Pardo, which suggests that the CHM concept is useful in "organizing new forms international cooperation in matters that are not directly related to specific areas of the Earth (…) [including] climate and the environment" (Pardo 1989,9–10).[7]

The resolution UNGA 43/53 (1988), as Borg (2007) recognizes, "identifies the legal status of an 'intangible' common resource (climate) that spans the global commons". It is with the absence of a theory capable of representing the intangibility of nature and recognizing legally a good that is both inside and outside of all states that we can summarize our inability to accurately portray the reality around us.

Therefore, expounding on the statements of the experts, the CCH is not really a substitute of CHM that was compressed and mutilated to fit the territoriality of the borders of states but rather an attempt to fulfil the original objectives of the CHM itself.

Still, the comments made by Shelton about this *quasi-concept* may yet prove extremely useful in the search of a legal environmental good when the absence of spatial character turns into a *living space*, as paradoxical as that may seem. "The environment is not an abstraction but represents a *living space*, the quality of life and the very health of human beings, including generations unborn" (Shelton 2009:2). This statement is in tune with space as a concept in the global context as considered by theorists on international relations: "Although globalisation theorists differ on whether globalisation marks a distinct rupture in modernity, they do agree that the separation of *space* from *place* is a basic characteristic of modernity that continues but accentuated form under globalising processes" (Coleman 2007:95).

4.6. A Safe Space Without Territory

One of the dimensions of complex sovereignty is its openness towards finding new concepts able to represent new *loci* in a transnational or global space. Thereby it presents an alternative to the exclusive perspective of *space* as a territory, distinguishing between *space* with its worldwide operation and *place*. For Giddens (1990:18),

> *The advent of modernity increasingly tears space away from place by fostering relations between 'absent' others, locationally distant from any given situation of face-to-face interaction… What structures the locale is not simply that what is*

present on the scene; the 'visible form' of the local conceals the distant relations which determine its nature.

And for Dirlik (2001:18), "Space in this sense refers to products".

This interesting development, where the spatial geographic representation is absorbed by the "functional" dimension of life, offers a *functional space* that is in accordance with Shelton's *living space* as a space system with the function of supporting life. On the other hand, the primarily spatial representation of the figure of sovereignty is relaxed, particularly when newly emerging forms of political authority are read to entail not only a spatial but also a functional reconfiguration. Such emerging forms are also read as the increasing importance of functional over spatial understandings of political authority. (Albert 2007:53)

The non-territorial and intangible character of the climate and the function of maintaining a stable climate meet this vision of a functional space. This new context is still going through a process of assimilation and conceptual adaptation. We should emphasise that the *living space* referred to by Shelton (2009) is not just the climate system but the whole life-support system, of which the climate system is just one part.

To clarify these concepts and introduce some order into our interpretation, we recur once again to Olfield and Steffen (2004:7).

The term *climate system* is also used in connection with global change, and is encompassed within the Earth System. Climate usually refers to the aggregation of all components of weather – precipitation, temperature, cloudiness, for example – averaged over a long period of time, usually decades, centuries, or longer. The processes which contribute to climate comprise the climate system, and they are closely connected to biogeochemical cycles. However, there are some important differences between climate change and global change:

- Many important features of biogeochemical cycles can have significant impacts on Earth System functioning without any direct change in the climate system. Examples include the direct effects of changing atmospheric CO_2 concentration on carbonate chemistry and hence on calcification rates in the ocean and also the sharp depletion of stratospheric ozone from the injection of chlorofluorocarbons in the atmosphere.

- Many interactions between biology and chemistry can have profound impacts on ecological systems, and hence feedbacks to Earth System functioning, without any change in the climate system. Examples include the impact of nitrogen deposition on the biological diversity of terrestrial ecosystems and the effect of non-climate driven changes in terrestrial and marine biosphere emission of trace gases and hence to the chemistry of the atmosphere.

- Human societies and their activities are usually not considered to be a direct part of the climate system, although their activities certainly impact on important processes in the climate system (e.g., greenhouse gas emissions).

The scale of the *living space* underlying the CCH would have to be the whole Earth System itself. This means, apart from the various *spaces* such as climate, biodiversity and oceans, we need an integrated and integrating approach. Considering that the UN recognizes the lack of a system approach to environmental problems, and that the *common concern* is the only *term in international law* capable of drawing a systemic reality that exists both in and outside of sovereignties, we need to evolve towards a concept that is able to define the *living space.* Although there has already been a consensus over the existence of a certain ecological global *living space*, there was no information available to define and delimit it.

With the exponential development of Earth System sciences in the last 25 years, and the evolution of Earth observations from space, much of what was concealed from our senses has turned into a reality that we can observe in real time as external spectators. By combining all the information of the spatial "big picture" with the information collected from the lower level of the system, for example, through climate palaeontology, it has become possible to reconstruct a history of the atmosphere and the whole Earth System. Knowing the historical behavior of the Earth System is crucial to understanding the value of the Holocene to humankind, it could have a central role in the definition of the new legal object that lacks protection.

Over the long course of history of our planet, many different chemical compositions of the atmosphere and the oceans have given origin to different levels of heat accumulation, energetic equilibrium and states of the Earth System. Knowing the history of chemical structures and the different resulting combinations of element interaction

allowed us to understand the true unique conditions that characterised the period of climatic stability in the last 11,700 years called the Holocene.

As we have seen in previous chapters, chemical alterations and the destruction of ecological infrastructures as a result from the Great Acceleration[8] are pushing the Earth out of the stable domain of the Holocene – the only state of the Earth System that we know for certain is capable of supporting advanced human civilizations – and threatening to undermine our prosperity. The scientific community has attempted to respond to the challenge of understanding and measuring this *living space* by developing the concept of planetary boundaries (Steffen et al. 2015; Rockström et al. 2009). These boundaries are based on the intrinsic "hard-wired" properties of the Earth System itself. They define a combination of indicators that describe the state of the Earth System.

With access to the information in the "software", we have gained the ability to define and measure our *living space*. The paradoxical system of problem words that defined concerns as legal concepts now have a table where the vital factors are properly listed, with every factor assigned to a safe zone, with a minimum and maximum that we must not transgress. And this is being done on a scale upon which we all truly depend – the global scale. So, the *living space,* an intangible and non-territorial space of the CCH, will coincide with this well-defined state of the Holocene, denominated by the scientific community as the *safe operating space of humankind*.

In conceptual terms, this *living space* operated by the *safe operating space of humankind* is consistent with the separation performed by international relations theorists between *space* and *place*.

If we are able to distinguish the planet, with its 510 million square kilometers, from the Earth System and its different possible states, we can start to imagine alternative concepts of global coordination, without affecting the constituent elements of sovereignty. In fact, within a context of systemic dependency of all sovereignties upon the same *living space*, the separation of this functional and intangible space of life from the physical space of the planet and its sovereignties may even be the theoretical foundation for the development of solutions.

This new conception of a safe operating space for humankind should in turn lead to a new juridical conception of the Earth System that corresponds better with the new scientific knowledge, notwithstanding the uncertainties that will always exist.

Considering that space technology allowed this intangible nature to become perceivable by our senses, and the concept of planetary boundaries offered us the "genetic

code" of the functioning of Spaceship Earth, we now have an obligation to organize ourselves and learn to steer collectively. In fact, the only thing that is truly within our reach is managing and governing ourselves in respect of our interactions with the Earth System. The creation of functional spaces without territory, thereby being global, may constitute a fixed point, an element of stability, upon which we may base a new approach and build an organization. In this sense, the possible construction of a new autonomous legal good as a converging point of a looking-for process should focus on the evolution of this combination of processes with shared origins and goals, continuing the search for the stabilization of a *space* to be invented.

4.7. From a Space of Concerns to a Heritage

The concept of CHM as a legal one is one of the most revolutionary and radical developments in the last 50 years of international law. Since its emergence, it became clear that no other concept, notion, principle or doctrine provoked such intense debate and controversy as did the possibility of attributing a heritage to both present and future humanity. Its revolutionary and subversive character stems from the philosophical concept of "humanity", which raises questions over legal regimes of resources that are crucial for the maintenance of the *living space* for and by both present and future generations.

Since the application and implementation of the CHM required critical re-evaluation of many principles and doctrines of classical international law, this adverse context inevitably resulted in an inadequate implementation[9]. Put otherwise, the application of the model as originally proposed by Arvid Pardo (1976), without the recognition of the different existing integration levels of the Earth System (unknown at that time), led to a confrontation between an intellectually valid philosophical principle, that recognized the ocean as a heritage of mankind and the lower system level where the model of political and territorial fragmentation reigns.

As the current legal order only acknowledged some of the separate and individual components of the Earth System and not the healthiness of the system as a whole at its higher level, the CHM concept was inevitably pulled towards the only existing lower level. At this point, a confrontation became unavoidable. It is true that the oceans possess a territorial dimension, but the presence of a functional biochemical dimension that

determines their quality is no less of a truth. This dimension, incompatible with the legal abstractions of political borders, is inevitably global.

In geographical terms, a dead and acidified ocean may continue to be the object of jurisdictional divisions of sovereign powers but it may not serve as an existing life support to marine life and humanity as a whole. It was this functional and qualitative oceanic system that Arvid Pardo was referring to when he launched the concept of the heritage of mankind in 1967.

As there was no legal distinction between the system and the place where the system would operate, the CHM was limited to existing concepts, imprisoned within the territorial dimension of place, becoming confined to leftover parts of state appropriations lying outside state borders.

It was the only possible approach; and in fact, it still is. However, soon enough a conflict was revealed between the interests and the territorial claims of states, rendering the approach inoperable for goods that cannot be geographically defined, such as the climate. This is why the vital good, a stable climate from which humanity has only been able to receive the benefits in the last 10,000 years, has so far remained a concern or a state of mind, reduced to a narrow concept of atmospheric pollution to be managed on a territorial basis.

Amongst existing legal frameworks, it is difficult to embed and create a non-territory, or a territory at global scale with intangible characteristics that escape the existing models of physical and biological nature. The only reason the CHM has survived, even though it subverts the model of political-territorial fragmentation, is due to the initial formulations proving to be philosophically valid and ethically undeniable. Actually, there exists a growing understanding that we are at the limits of international law and we need a radical advancement, and CHM and its CCH substitutes and ineffective derivatives are concepts that could open the door.

4.8. Holocene State as a Heritage Protected by Law

The process that gave birth to the period of the Holocene, unique in terms of climatic stability in the history of the Earth,[10] was a phenomenon of spontaneous *emergence* from the combination of certain elements and their proportions, and which in their reciprocal

interactions formed a pattern, giving rise to a combined organizational "order". This natural process should be embraced by humanity as one of the greatest gifts it received from nature, as it was exactly these conditions that allowed for the development of human civilizations and all the species of the planet that share the same ecological needs.

We are not able to protect this phenomenon of emergence or teleconnections but we can protect the biogeophysical structures and processes of the state of the Earth System that assure its maintenance. These biogeophysical structures and their internal relative concentrations of gases are a gift to humanity that resulted from millions of years of interactions at Earth's history scale. These intangible conditions have the highest value for humankind. They are a true *grundnorm,* where other values, already legally protected, and a system of organization should establish its *locus*, its basis of stability.

According to Rakhyun and Bosselmann (2013:283),

> *This context, the planetary boundaries framework, scientifically suggests the existence of a foundational environmental principle or grundnorm, which, for the purpose of our research, can be defined as a basic norm to bind any governmental power. This understanding differs from Kelsen's definition, and is closer to Kant's argument that any positive law must be grounded in a 'natural' norm of general acceptance and reasonableness (Vernunft) to prevent pure arbitrariness. The existence of an environmental grundnorm, therefore, rests on the assumption that respecting planetary boundaries is a dictate of reason (Gebot der Vernunft) and general acceptance (allgemeine Gültigkeit). Conceptually, a grundnorm exists independently of a legal system, but underpins legal reasoning in the form of an inference rule.*

In this sense we can argue that the *state of the Earth System* corresponding to the geological period of the Holocene carries the meaning of heritage as something we need to conserve in everyone's interest. It enables the recognition of a *new value* to be legally protected as an international autonomous legal good. "Heritage is one idea. It is a philosophical idea, a legal concept, as is something that we need to conserve" (Sobrino 2012:4).

The evolution of the international community, the vital value of this state of the Earth System and the heritage dimension derived from the need to transmit it to future generations enable the recognition of something higher in scale than a concern or an interest that should be legally protected as an autonomous legal good.

The evolution of a *living space* "*concern*" towards a common intangible natural heritage of humankind as an authentic autonomous legal good seems a crucial conceptual advance for the organization of human relations, which have broadened to a global scale. With the scientific "safe operating space", the legal concept of the *living space* could have a value that can be measured.

As Sobrino (2012:5) stated,

> *I think this idea, to being more than an idea, must institutionalize itself (...) If we combine the idea of heritage with the idea of an international authority and place relative competences on it – not many are needed, apart from certain ones to establish a multilateral framework for action – I think that would resolve many of the current tensions.*

The legal concept of heritage can be the *locus* for that vital good, the *living intangible space,* represented by the *safe operating space,* and at the same time to be the support for a global organization.

What is certain is that a purely formal legal approach towards the current notion of the CHM will exclude the maintenance of this Earth System state within the biogeophysical characteristics of the Holocene. The protection of a certain state of the Earth System can only be legally framed by proceeding with an axiological and teleological interpretation at the basis of the legal consecration of the CHM and its substitute derived concepts.

Arvid Pardo's vision that gave origin to the concept of CHM involved the perception of the "ocean environment as an integrated fluid ecological system" and the concern "that continued, unmanaged use of the world's oceans would become a serious threat to international peace and security from the environmental impact of new technologies, the militarization of the seafloor and expanding state claims to jurisdiction over large parts of the oceans".[11]

To realize these objectives through the legal regime of the CHM involves distinguishing the system concept and its *intrinsic intangible quality* from the territorial and geographical approach of already existing legal concepts. But as Taylor & Stroud (2012, 19) state, "Arvid Pardo (and others) considered the CHM regime flexible enough to adapt to the emerging challenges, the discovery of new resources and values, such as scientific research".

Departing from this approach, unrealized due to theoretical and practical impossibilities at the time, we will try to adjust the initial intentions of the CHM to the

current criteria for the intrinsic unit of the Earth System. While the artificial separation between oceans, climate and biodiversity may be necessary for reasons of task organization, this lower level of operation should not conceal the need for intervention in the protection of biogeophysical conditions at the higher-level integration of the Earth System. This intervention can be put into practice through application of international standards on the quality of the Earth System state realized by the approach of the planetary boundaries.

Nonetheless, it is of interest to understand that all the substitutes and derived concepts gravitating around the CHM seek to plant a seed for the development of a normative framework that offers alternatives to governing the global common goods, and not only the areas and resources beyond its jurisdictions. So, in order for the CHM to become an operational/normative concept, its object needed to be deterritorialised and made to coincide with the initial concepts and premises formulated by Arvid Pardo.

The entire range of more or less indeterminate concepts pursue the same unique end, the reason for their existence being the absence of instruments that could somehow constitute an object of intellectual representation of reality, in this case the Earth System as a whole within a state that supports the *living space*. It is therefore crucial to understand in detail the differences between the concept of CHM and the CCH derived from it. Based on the proposal of Murillo (2008), we will compare them with recent knowledge regarding the safe operating space for humankind and how they may be re-framed so as to correspond to recent scientific evolutions.

TERRITORIAL SCOPE	**CHM**	**Areas beyond national jurisdiction and its resources**
	CCH	A wider scope – applied in the intangible higher level, both beyond national jurisdiction but also within the jurisdiction of states.
SUBJECT SCOPE	**CHM**	The main focus is related to the geographical areas beyond national jurisdiction and its resources.
	CCH	Focused in *functional intangible spaces* that are a "concern" to humanity as whole. At present, the matters are climate change, species in danger and conservation of biodiversity. The intrinsic intangible ecological quality does not exist autonomously on the geographical space. Therefore, the CCH continues without a clear and precise definition, liable to generate rights and duties.
DISTRIBUTIVE SCOPE	**CHM**	Equitable sharing of benefits.
	CCH	Equitable sharing of burdens – cooperation and problem solving.

Figure 6. Differences between Common Heritage of Mankind (CHM) and Common Concern of Humankind (CCH)

From the analysis of different perspectives of the approach that considers the Earth System as a unique systemic whole with intrinsic limits regarding its state, we are able to identify the following advantages and disadvantages.

TERRITORIAL SCOPE	The CCH offers a more adequate response to the characteristics of the Earth System both in and outside sovereignties. But it has the disadvantage of not having a *locus,* unlike the CHM, so it cannot be attached to a space on which an organization can be built.
SUBJECT SCOPE	The CHM carries the advantage of being able to delimit the area or resource in question, while the CCH has a problem with the intangibility of the object.
DISTRIBUTIVE SCOPE	From the perspective of the Earth System, damages and benefits, caused and produced upon the Earth System as a whole, are shared.

Figure 7. Comparative Analysis of Common Heritage of Mankind and Common Concern of Humankind

In summary, we can say that while one has a locus and does not possess an appropriate territorial scope, the other has the appropriate territorial scope but does not have a locus. In regard to the distributive scope, the sum of both may adequately address the characteristics of globally shared damages and benefits at the level of the Earth System.

In this sense, the combination of some of the characteristics of both concepts may bring the necessary advances in law and international relations with the objective to constructing an institutional architecture more adapted to the environmental living space in response to a collective concern of humanity.

4.9. An Evolutional Legal Living Space

Both concepts of *living space* of the CCH and the *safe operating space of humankind* maintain the common characteristic of being intangible non-territorial spaces regarding the biogeochemical conditions of a certain state of the Earth System that supported favourable conditions for human life on Earth. However, their origins are different – one legal, the other scientific. This primordial nature is found on the level of the meta-heritage or constituent heritage (Soromenho-Marques 2006), an intangible natural heritage that is the fundamental basis for the intelligibility of all other types of tangible natural heritage already known. It is represented by the processes of life or the major circulatory element flows, which in a previous analogy was referred to as the software relationship of the Earth System.

As a concept, 'state', which is profoundly rooted within territorial space, does not include the *global software* that supports the life system on Earth. The 'safe operating space for humankind', as the best available integrated piece of scientific information with the capacity to elaborate on emerging phenomena in a systemic way, may constitute a keystone of this announced evolution. The question then becomes whether this scientific instrument is sufficient to represent the multiple realities of the Earth System as a whole and in an immutable way.

Although there is still uncertainty regarding the quantification of limits and the existence of planetary limits, they are clear and entirely consistent with the science of complex systems. As we cannot "aspire to a immutability of physical biological and chemical elements" (Canotilho 1991:123), it will be necessary to operate permanently on an evolutionary flexibility. The ecological paradigm is characterised by complex processes, which inevitably engender uncertainty. "It is up to the law to transform this ecological uncertainty into a social certainty" (Morand 1995:212).

In this sense, this *living space* will always be a scientific representation of a dynamic system. Therefore, the instrument used for its interpretation will also need to be flexible, dynamic and evolving, allowing a dialogue between the human species and the Earth System that we are part of. The creation of a new international intangible space, while founded in an ever-developing science, will have to be founded on a socially constructed "value" that will guarantee its existence independent from scientific evolutions on the Earth System.

The important thing will be the concept that there is an intangible *living space*, both in and outside sovereignties. Considering present scientific knowledge, this corresponds to the safe operating space of the Holocene, but the concrete definition of limits and elements to be taken into account within this socially constructed space will evolve along the line of continuous, evolutionary and dynamic knowledge on the Earth System.

Once again, as Morin (1990:8) states, complex thought "has no intent to replace the ambition of simple thinking, which is to control and dominate the real. It is a thought experiment that is capable of handling the real, and negotiate and enter in dialogue with it".

The key will be to find an instrument that represents the known reality of the Earth System, allowing us to enter in dialogue with it.

4.10. Applying CHM to the Earth System

From the initial intentions and derived concepts that evolved from the CHM concept will result a new legal object based on the fundamental separation between the *res incorporales* relative to the intangible dimension, qualitative and functional of the Earth System (higher level of integration), and the *res corporals,* referring to the territorial spaces (land, oceans and areal space, i.e., the lower level of integration) in which these functions and qualities develop.

In this sense, we advance a proposal for an evolution incorporating the combined elements for an axiological interpretation of CHM applied to the Earth System:

- The biogeophysical structure of the Holocene period is part of the international common heritage (patrimony) and therefore *belongs to all humanity in common*. This means it cannot be owned, enclosed or disposed of (i.e., appropriated) by any state/s or entity. As a commons it can be used, but not owned, either as private or common property or via the claim of sovereign rights;

- The use of the common heritage framework shall be carried out in accordance with a system of cooperative management, for the benefit of all humanity (or common good). This has been interpreted as creating a type of trust relationship, with states acting as trustees for the benefit of all humanity (i.e., for the common

good, not for the exclusive benefit of states/private entities) including future generations, taking into account the particular needs and interests of developing states (intra-generational equity);

- There exists a permanent sharing of damage and benefits realized over the state of the Earth System. It will be necessary to construct an accounting system in order to account for the contributions of each state towards the desired state of the Earth System, and next develop an equitable system of derived compensations for the different uses of the CHM;
- A global entity should be created with exclusive functions in coordination of compensations and the development of projects for the maintenance of this common heritage of mankind.

TERRITORIAL SCOPE	**Scope**	The Earth System as a whole – applied both beyond and within the jurisdiction of States.
	Form of Representation	The higher level of Earth System integration. The intangible nature. The well-defined status of the Earth System corresponding to the geological age of the Holocene.
SUBJECT SCOPE	**Scope**	Representation of a functional *living space* for humanity as whole, in a trans-temporal dimension. The *safe operating space of humankind.*
	Form of Representation	Planetary Boundaries Framework
DISTRIBUTIVE SCOPE	**Scope**	Equitable sharing of benefits and burdens through a system of compensations – ECOBALANCE
	Form of Representation	An aggregated metric with the ability to represent the positive and negative impacts realized upon the Earth System.

Figure 8. Features of a possible evolution of CHM/CCH to a Common Intangible Natural Heritage of Humankind

This possible pathway of the natural heritage, from the "materially and geographically definable" to the "immaterial and intangible", is similar to the consolidation of cultural heritage. The importance of cultural heritage was consecrated in UNESCO's Convention concerning the Protection of World Cultural and Natural Heritage in 1972, but 30 years later it was acknowledged that cultural heritage cannot be limited to what can be seen or touched, so immaterial heritage was included in the Convention for the Safeguarding of Intangible Cultural Heritage in 2003.

The time has now come for intangible nature to be recognized as a vital resource for all humankind – a common intangible natural heritage of humankind.

4.11. Conclusion

It is now recognized in the current doctrine that international law is not yet equipped to handle the ecological goods that exist simultaneously in and outside of all states. There exists a structural, theoretical flaw in the approach to the global "whole". This flaw extends to the time dimension of the chain of successive human generations. The global commons have always been (and continue to be) understood as geographical spaces that only exist outside the political borders of states. Likewise, humanity and its future generations, despite being repeatedly referred to in international conventions, do not possess a legal status that corresponds with an efficient protection.

The global, diffuse and intangible dimension of a vital good such as a stable climate, existing both within and outside all states, with the effects of the damage caused upon it extending over several generations, transformed this traditional approach into an ecological nonsense. The dysfunctionality of existing legal instruments not only has long since been detected but has also been the object of several attempts to build concepts, which, however, are soon found to be inoperative, with no legal consequences in terms of rights and duties.

Alongside the increasing understanding of the functioning of the Earth System, together with the possibility to measure its state through the planetary boundaries, a giant leap was taken towards the unravelling of the nebula composed of legally vague and undefined concepts disseminated in national and international legal texts. International Law expressions such as *the common concern of mankind, common interest, life-support system, intergeneration equity, ecological integrity and sustainable development* can now be sustained by a pattern of indicators that may be used to translate and delineate the lack of legal definitions, opening up new perspectives in the construction of solutions that will overcome the dysfunctionality between the ecological reality and the existing legal framework.

These vital factors, translated through these indicators, as they are global and diffuse, are still legally non-existent and considered "external" to social organization. They are the known economic externalities, either positive (regulating ecosystem services) or negative (pollution).

The concept of the common heritage of mankind has stayed tied to the geographical areas of political division between states. Until now, World Heritage has only been applied to goods that, despite their outstanding universal value from an aesthetic or scientific point of view, are found within the geographical area of a state.

These two legal concepts (CHM and WH) will possess a greater potential for evolution towards instruments capable of protecting this vital and global good, and their sum can cover the geographical area in which the Earth System operates. The World Heritage has already made the shift from tangible cultural heritage towards intangible cultural heritage. It seems that we can now reproduce this pathway in regard to the natural heritage (Aragão 2016). So, being in the possession of a way to represent a favourable state of the Earth System through the structure of biogeochemical concentrations that remained relatively stable over the last 11,700 years – the Holocene period – we propose the recognition of a well-defined state of the Earth System as a world natural intangible heritage of mankind. This new natural intangible heritage should be the *locus* on which to construct a system for the management and maintenance of Earth System use. Upon establishing rules applying to the use of the Earth System, we are also securing the minimum conditions for the dignity of future generations. But before undertaking institutional reform, we need a concept that allows for a solution that will fill the gap between the theory underlying the organization of international institutions and the reality of Earth System dynamics.

This is a structural prerequisite to building the equity and trust needed for collective action. In this sense, it will be a structural instrument for the application of human rights.

Chapter 5

Earth Condominium – A legal model for the Anthropocene

"It seems that the human mind has first to construct forms independently before we can find them in things."

Albert Einstein

5.1. Political Impossibility?

In a seminar organized by the Academy of Environmental Law (IUCN), Simone Borg (2001) presented a paper with the title "Climate Change as a Common Concern of Humankind." In it he posed two fundamental questions:

1) Is it necessary to identify the legal status of climate?

2) Will we gain anything from doing so?

We have accepted that the good to be put under the protection of the law is not only the climate but a well-defined state of the Earth System, as Olfield and Steffen (2004) have already demonstrated. Now, it seems to us that any satisfactory attempt to answer these questions can only be made if we first answer another question asked by Alexander Kiss (1982.121) on the definition of *res communis*: "Of course, one may question the exact meaning of this concept: is it a common sovereignty, a co-ownership, a condominium? We must recognize that this question has never been solved in a completely satisfactory manner – that is precisely one of the major arguments of the advocates of the conception *res nullius."*

This statement redirects the point from the need to recognize a *legal status* for the climate or the Earth System to the real crux of the issue: whether there is a legal framework able to receive and integrate a new *legal status* with respect to a good that is

simultaneously inside and outside of all sovereignties. The problem is establishing the type of *res communis* of this new legal good, and that will be decisive in its new legal status being, or not, compatible and integrated in the existing legal framework. It is in the absence of a clear definition of what a "global common good" is exactly, that is, what is the *res communis ommnium* which is not restricted to the global commons but spans also across areas subject to national jurisdiction (Borg 2007), that creates the breeding ground in which all uncertainties can germinate. This absence is the epicentre of our legal nebula, our confusion, our *legal black hole* through which the most vital factors for our future disappear. Awareness has been growing that the term *common concern* can only express our embarrassment, our incapacity to define in a simple manner, to name in a clear way or capture with words a vague terrain of ideas.

When one states that the *common concern* was the fall-back solution because there was no real political will to build a new legal object, this is only partially correct. In fact, without first identifying the legal regime of *res communis* needed to reconcile the intrinsic characteristics of the new legal object with the existing international legal framework, even if there had been political will to recognize the existence of a new legal good, the result would probably not have been very different from the existent incompatibilities that continue to relegate CHM to the ever- smaller remaining parts of jurisdictions, and the CCH for a future always postponed.

A desirable conservation of the Earth System cannot be regulated effectively if it is based only on international laws sustained purely on interstate consent and reciprocity. A new legal framework must be built that ensures also the protection and promotion of common interests by representing the interests of all humankind. Without this, vital factors will continue to be perceived as concerns, or will conflict with *ecological nonsense*[2] approaches. The question "How can we admit that a good that belongs to no one may be governed by a specific law?" (Kiss 1982:122) implies understanding what theoretical legal framework is more able to explain and receive this new object of law. If the basic statement that the absence of ownership is synonymous with not being governed and therefore being a *res nullius* is correct, how is it possible that a new global legal object, called here the *favourable state of the Earth System*, can come into being and be ruled in a context of a fragmented territorial sovereignty without any legal representation of a global *res communis*?

The remaining ecological space (Rockstrom 2014), scientifically represented by the safe operating space for humankind of planetary boundaries and the living space as the

non-territorial space of the CCH, "can be considered as a fine-tuned version of the res communis status of global natural resources in light of the contemporary developments" (Borg 2009:4). This view could also correspond with the problem of res communis definition, as reported by Kiss. But perhaps the main response to Borg's original question is the need of the good to belong to someone in order to be ruled and not be a *res nullius*.

5.2. Two Different Levels of the Earth System, Two Different Levels of Human Relations

If we need to change our relationship with our life-supporting system from exploitation to stewardship, humanity has to self-organize within this remaining living space and ensure its maintenance in a well-functioning condition. This means that the main task is the internal organization between all the users of the same resource on a global scale. This fact puts humanity in the unavoidable position of relating internally in two different scales. This means that it will be in the way the Earth System is used that the relationships between all communities and individuals will be established.

Like all complex systems, the Earth System has two levels of integration, a lower level of component parts and processes and a higher level that constitutes the whole system with its emergent properties that cannot be understood or described by simply aggregating the component parts up the global level. The first level is related to the geographical area, that is, the heterogeneous physical planet with 510 million km^2 on which different state sovereignties operate and that is also the *locus, the hardware* of the Earth System. The higher level (the Earth System itself) is intangible as it arises from the global interconnections and emerging phenomena through which global human relations are mediated. This higher level developed in an evolutionary fashion throughout Earth's history and it is through this evolutionary process involving the living part of the planet as well as the geophysical that, for example, the relative concentrations of gases remain relatively constant through time. A key process of the Earth System is self-regulation, which consists of feedback loops formed by component parts of the system (both inside and outside of all sovereignty and incapable of any legal abstraction of division) that work synergistically to keep the system in well-defined states.

In essence, it is the integration of the geophysical properties of the planet with the living biosphere that forms the intangible Earth System, a single global system incapable of any legal abstraction of division. In this sense, the intangible Earth System is an authentic law of nature, already described by science and recognized as the "principles" that govern the natural phenomena of the system. Humanity, as an integral component of the Earth System, is also dependent on those principles, and, as such, humanity is related to the Earth System on two distinct levels in equal terms.

On a lower level, humanity is organized as independent political communities around a defined territory. On the higher level, the relationships are established and mediated through the use of a single common system, the Earth System, which does not exist legally and as a consequence is unmanaged.

So the main answer to Borg's initial question has to do with the reconfiguration of inter-subjective relations between all users of the same *resource*. As stated by Filipe et al. (2007:84), "It is from the relationships established when carrying out the use of the resource that arise concepts as the right to common property or private property".

5.3. A Heritage to Organize Relations

Since the use of the common resource, called here the favourable state of the Earth System is extensive temporally and its effects are intergenerational, it is also through this *resource* that relationships are established between generations past, present and unborn. Theory has defined *property* not only by the individual's relationship with the inherent characteristics of the object but also to include the underlying relationship between the owner and all other individuals. According to Hang (2003), the most relevant is the relationship between individuals, because property rights are a relationship between individuals in relation to a resource, not a relationship between an individual and the resource". Once the use of this limited resource is not exclusive to any "user" and no user can exclude access to any other, in global terms we are facing a situation of common ownership extended to the scale of all humankind *(Res communes ominium*). From the moment it is discovered that a resource considered inexhaustible is, after all, exhaustible, internal relations are equally reconfigured among all users of that *resource*. For Schmid(1995) property rights represent a set of ordered relationships among people which define their opportunities, their exposure to the acts of others, their privileges and

their responsibilities for resource utilization". When the resource in question is a *res incorporales* relative to a certain favourable state of the Earth System that everyone depends on, all users share the consequences of the acts of others.

Constructing a system to organize each actor's privileges and responsibilities regarding the use of a resource that belongs to everyone, born and unborn, becomes a matter of survival.

To that extent, the legal recognition of a *favourable state of the Earth System* as a common heritage of mankind should primarily result in a regulatory instrument of relationships between individuals, states and communities. That is, if everyone has access to the good and its benefits, and no one can be excluded, we will have to answer questions like: Who is responsible for maintaining it? and What are the rules for using it (rights and duties)?

The legal absence of the good also corresponds to a social failure, to the *res nullius*, that is, the absence of rules between individuals or states on the use of the good. The perceived relevance of the underlying relations of property ownership will be the most decisive factor in justifying the need to recognize legally the existence of the Earth System, and to give it a patrimonial dimension.

When we structure global and inter-subjective relations based on the relationships established through the use of a common good to which is assigned a value *per se*, we are simultaneously building a system to ensure its maintenance and allowing the construction of a larger global justice as they are intrinsically related.

As a result, the preservation of the new legal good should result from a collective action internally organized between the users rather than by a legal obligation. Thereby, the new heritage shall be the mediator of a dialectical relationship developed on a global scale between social internal relations and the object (Earth System). To that extent, planetary boundaries should not be perceived as a new prohibition but as the limits that underlie and justify our self-organization. We can even say that the ultimate goal of acknowledging this common natural intangible heritage of humankind is the construction of a globally organized society around a common heritage, an intangible *locus* around which humankind organizes itself.

If nothing can exist in pure disorder, the survival of the human species as a whole depends on its ability to self-organize. So, it's at the level of consequences for subjective relationships in the internal organization between users of the common resource that the

greatest justification for the legal consecration of a well-defined state of the Earth System lies.

If one accepts that the legal recognition of a favourable state of the Earth System is a basic structural factor for the organization/regulation of the internal relations of humanity, a key question remains unanswered: Will it be possible to conciliate in a symbiotic way the existence of one global legal support (the legal status of Earth System) with the fragmented territorial sovereignty? Taking as a starting point the two levels of the existing relations, we will try to understand which model of *res communis* is better able to accurately portray the facts: "the common sovereignty, co-ownership, the condominium?" (Kiss 1982:122).

5.4. Divide to Organize

Taking as a starting point the unique characteristics of the climate and the Earth System as a whole, and the alternatives presented by Kiss (1982), it seems that the hypotheses of both common sovereignty and co-ownership imply the maintenance of the idea that there is a separation between what is within the borders and the *res communis,* which corresponds with the leftover areas of the division. In this sense, none of these models seem to have the necessary characteristics to be able to deal satisfactorily with the problem of activities affecting negatively an Intangible Natural Resource, which spans across and beyond the national territories of States (Borg 2009). This overlap of interests between the private interests of states and the interests of all humanity has an inherent condition of interdependence: it is mutually beneficial or mutually destructive. The problem of reconciling seemingly opposing interests in a situation of symbiotic interdependence is not new to legal sciences, and it was structured through a private law figure that defines the situation where a materially indivisible thing, or a thing with a unitary structure, belongs to various co-owners where each one has private or exclusive rights of ownership over determined fractions and at the same time, are co-owners of the parts of the building, which constitutes its common structure. This juridical figure is known as a condominium.

In order for this model to transform a theoretical impossibility into a solution, it was necessary to innovate and not be limited by the application of pre-existing forms of *dominium*. Once neither private property nor co-ownership could deal with the relationships established through the ownership and use of a materially indivisible

building, the condominium was invented. First it accepted the unitary and indivisible nature of a building and then built a system that would adapt to this seemingly unsurpassable circumstance. It argued against what was previously considered to be irrefutable and created a model of ownership that cannot be associated with any other form of ownership. As magistrate Luís Hernanz Cano (1998:41) says, Spanish jurisprudence has perceived horizontal property as "special property" or "complex property". Its accurate designations are clearly a sign of its complexity: "house by storeys", "condominium of storeys", "*pro indivisio* communities", autonomous fraction", and "community with rights in rem" (Cano 1998: 41). The motive for such complexity is the coexistence of apparently contradictory and antagonistic elements, which, if considered superficially, may create the supposition that the presence of one implies the absence of the other and is hardly translatable in the reductive language of definitions.

The urgent need for a solution led to one capable of combining within the same materially indivisible building a separation that allows several individuals to use the same floor as housing. Additionally, it envisages: a) that each individual has a unique right to ownership of a fraction of the building, making possible the legal trade of these properties; b) the existence of a system of contributions to ensure the maintenance of systems of common use (water, electricity, elevators) and the parts that are legally and materially impossible to divide (stairs, roof, structure, etc.), which must all be maintained in a dependable state.

The model of the condominium, or complex property, is not a community or an arithmetic sum of individual properties. It is something complex that elevates the law to the art of reconciling the extremes, of making symbiotically dependent what was apparently incompatible (Magalhães 2007:87).

Although with some nuances, this theoretical model has been used recurrently throughout history in international law, in situations of shared rivers, small islands, territorial enclaves, territories under dispute and in undefined political situations or even at the level of small communities wishing to establish access to certain resources related to rural activities. Even the Antarctica Treaty System of 1959 is considered by some as a *de facto* condominium (Glennon 1991), since it is not a sovereign territory (although various nations claim parts of its territory as their own) and provides voting authority for 28 nations to jointly govern the area. In all, 50 countries are part of the "condominium" although some consider it a "quasi-condominium" (Hemmings 2014).

The use of civil juridical institutes originating from national laws is not new in international law. For some authors it is even recommended. Weeramantry (2000:195) points out that:

> In view of the speed of progress and of technology, the national laws and international law should follow the movement and increase their productive and adaptive ability. New concepts and procedures should rapidly be sought to confront the new situations, which are a result of technology's progress. For this effect, international law should firstly be aware of all the essential traditions of the different civilizations and adopt a multicultural attitude. Numerous principles of international law, which will be adopted in the future, may be released from the traditional juridical systems existent in the world and through which international law may receive its strength and inspiration.
>
> The change from the soft law to the hard law should be accelerated, thus making international law more fit to adapt itself to the needs of our time. National laws will take advantage of the norms and of the universal patterns, which will equally improve the internal systems.

In the classical approach, commons management is doomed to the fate of the "tragedy of the commons". Hardin's work transformed a growing pessimism around the "commons" into a global scale pessimism, also called by some doctrines as the "tragedy of the common heritage of mankind" (Shackelford 2008). It considers "communal sovereignty may be seen as a temporary placeholder that exists until technology enables occupation of property making it worthwhile for States to assert national sovereignty in the oldest traditions of the Westphalian system". In this view, "establishing property rights has been commonly seen in the Western world as the solution to commons management; once occupation of a territory is possible, then property rights become necessary to catalyze development" (Shackelford 2008:120). This heads to the still-dominant doctrine that points out as a unique solution the division and privatization of the good. However, ecological interdependence has shown that it is necessary to develop a new theory to explain phenomena that do not fit in a dichotomous world divided between individual/state interests and collective/humanity interests. In an attempt to develop legal or economic instruments to involve collective interests, the conditions that block a class action or give rise to a conflict are recognized.

In his analysis of the strategy of conflict, Schelling (1960), winner of the Nobel Prize for Economics and one of the fathers of the theory of games, showed that many social interactions can be seen as non-cooperative games that involve both common and conflicting interests. In fact, Schelling sought to consolidate the idea that almost any problem involving the decisions of more than one person simultaneously contains elements of conflict and common interest. It is in the apparent contradiction of the symbiotic relationship between individual and collective interests (masterfully defined by Kant, "Only in the pursuit of common interests can we guarantee our individual rights)"[4] that we will try to reinterpret the analyses already carried out on the structural paradox of these interrelationships, which are exercised in an mutually advantageous form or a failed coordination would give rise to high costs for all parties (Filipe et al. 2007). The condominium transforms dichotomous dogma into accidental truth, and achieves, without denying the classic solution of division, the integration and symbiotic unification with the common property.

The big news is that although the condominium divides in order to organize the different tasks and responsibilities, these are carried out not only to define distinct private properties but also to distinguish all private properties from parts and systems that are in a regime of common ownership. It is precisely through the distinction between different types of ownership over the same materially undivided good that this form of "complex property" can harmonise the different private and common interests, making this overlap of properties perfectly symbiotic.

Separation is managed through a legal abstraction, allowing the existence, within each individual fraction, of elements that appear to be private but are actually common (e.g., main walls, structure, exterior walls, roofs, water distribution system, and electricity). The operation is not just a mere division of spaces but a division with qualitative and functional criteria regarding the intrinsic nature of the different elements in a building.

The criterion on which this approach is based is that all those constituent and functional elements whose lack of maintenance implies damage for all owners of individual properties within the building should be integrated into the co-ownership regime. That is, common parts are all parts of a building that cannot be materially assigned to only one owner, as well as all elements and systems that are decisive for the operation and security of the entire building, obliging all to participate in their maintenance.

Only through a clear identification of what those elements are and what is under common ownership is it possible to establish a system that ensures the maintenance of the common parts together with the systems and services that are of common interest. In other words, only the precise definition of all the elements that are in co-ownership will make possible to assign responsibility for the management and maintenance of such property, and create a contribution system among all the owners in pursuit of common interests.

The process of this theoretical construction was not a conceptual process that was then applied to the good, dividing it arbitrarily. On the contrary, it departed from the unitary character of the property, identified the elements that by their nature are essential to maintaining the structure and operation of the building, and considered as private all those spaces and goods whose individual ownership does not pose a problem to the unitary and functional characteristics of the common good.

This overlap between private interest and communal interests assumes that every homeowner simultaneously pursues private property rights on their fraction and co-ownership of common elements, having the right and obligation to participate in decisions concerning the management of common interests. "This duality of rights – private ownership and co-ownership of common elements – will definitely mark the unique and original character of this legal model. As in all situations where the antitheses touch and complement each other, there is a fertile field for searching for appropriate definitions and explanations of a reality that is complex" (Magalhães 2007:86).

Spanish jurisprudence considered it to be an authentic masterpiece of legal construction after 1960:

> The ownership of homes by storeys is an institution of a complex nature, whose type is the right to ownership, but within it, it constitutes a class detached from the traditional ones, and it is useless to search for similarities or partial identity since there is no community because of the private elements belonging to various owners; nor does servitude help to explain the situation of all the common things, but merely determines relations which only exist between the owners of two or more storeys, but which affect everyone.

As Hang (2003) understands, the most relevant is the relationship between individuals. More important than any similarity regarding the type of the good or its scale is the structure of relationships that arise around the ownership or use of a particular materially

indivisible good. In this regard, also in terms of the scale of the Earth System as a whole, the most important point to understand is the structure of relationships established through the common use of the same global and unitary system, the Earth System, so that a legal abstraction cannot divide it.

Assuming that the ecological problem is not a malfunction of the Earth System but rather a poor adaptation of human society to its functioning, it seems to us that the path to a possible solution, rather than ideological or techno/scientific choice, should be a technical answer in the social sciences with special resort to law. Here we mean law not as a system of sanctions and prohibitions but rather in its prior function of organization and regulation of human relations but widened to a global scale.

5.5. Divide to Unite

All spaces that have become accessible to humans throughout history have been subject to their legal definition. The possibility of humanity as a whole to become a geological force capable of changing the state of the Earth System requires that the intangible non-territorial space, the *living space*, represented through the core drivers of the state of the Earth System, becomes a safe space where its use is subject to order.

The problem arises because this new space has a new character, not geographical and territorial, distinguishable and therefore completely distinct from all other spaces previously discovered, even when compared to space exploration where the existence of intangible natural resources is already recognized today. This non-spatial space is not external to the planet but part of the Earth System, and is present inside and outside of all sovereignty, creating an inextricable link between the activities of states within national territory and its effects on climate (...) an unprecedented situation in international law (Borg 2007). It is from this overlap that the need for international law innovation (Prieur 2012) comes, regarding the still- dominant view that represents reality only under an optic that what is common to all humankind are the remaining areas of territorial political divisions. A clear distinction between this new intangible space and the territorial geographical space is only possible through the use of the latest scientific knowledge on the functioning of the Earth System as a whole. The possible legal definition of this new space and the resulting regulatory order of its use constitute *per se* a change in the conceptual paradigm of the international legal system. This innovation, because it is structural, implies a theoretical framework that allows an overlapping of legal regimes

between the *res corporales* concerning the sovereign territorial spaces of states and the natural *res incorporales* concerning the global *living space,* that is, the qualitative dimension of the structure of biogeochemical concentrations of oceans or the atmosphere, which are global and impossible to divide by any legal abstraction.

It is this overlap between the territorial space of sovereignty and the global intangible space of the living space that requires clarification of the type of *res communis* better able to portray the reality where tangible and intangible spaces overlap and affect human relations. The fact that the system is common and indivisible, that all people have equal access to it and no one is able to exclude any other from using it, is exposed to all others by virtue of sharing globally the damages, which in turn also result in very different uses, requires us to look at this deep interdependence from a legal perspective. Everything becomes even more complex when, for the same reasons, the benefits realized by the ecological infrastructure in the state of Earth System are equally shared by all on a global scale.

The distinction made by the Roman legal system between *source* and *resource* can be extremely useful in clarifying the structure of the relationships resulting from different uses of the common system. As we have already stated, "*res communis* differs from *res nullius* in that the *source* of resources cannot be appropriated but the *resources* themselves are amenable to appropriation" (Oosterlinck 1996:2).

The *favourable state of the Earth System* resulted from an evolutionary process throughout Earth's history involving the interactions between the living biosphere of the planet and the geophysical part, that is, the ecological infrastructures are the *sources* of this favourable state, and that allowed the development of human civilization. The *resource* is the favourable intangible structure of biogeochemical concentrations on the Earth System. In other words, the *resource* emerged from the interactions of the *sources*.

Conversely, in this situation, by its very nature, the *source* is appropriable (the ecological infrastructures are under the territorial jurisdiction of states) but not the *resource*, that is, the resource is dispersed all over the planet and its appropriation is physically impossible, as is any legal abstraction of division. In this regard, although the *sources* are under state jurisdiction, with territorial jurisdiction over the areas where the ecological structures exist, the benefits realized by these structures in the state of Earth System (*resource*) are inevitably common.

On the other hand, if all states use the system, all of them have sources that contribute to the maintenance of that favourable state. However, the disparity between areas and the

performance of different ecosystems on qualitative and quantitative levels generate large differences between states with regard to positive contributions to the maintenance of that favourable state. If we add to this discrepancy the differences between different uses, we fall into a chasm of inequality.

This really is a truly new situation in the history of international law, and neither a state-centred sovereignty nor communal sovereignty (in an isolated way) can read the relationships established through the use of the same indivisible common system.

The tension generated by the interdependence of benefits and harms shared on a global scale in a juxtaposition of interests is a complex equation that requires a complex solution, which does not sit well with the simplified concept of geographic territorial division.

In terms of buildings, the success of the condominium model was due largely to the dual approach of the internal differentiation. It not only used a spatial criterion in order to internally distinguish the private spaces of the common spaces but functional criteria, even within the private spaces, that identified certain elements which, due to their characteristics and functions, impacted the safety and functional units of the building. These would have to be regarded as common since, if the maintenance was not provided by the private owner, the damages would be collective. By overlapping different legal regimes (private and co-ownership) and simultaneous use of spatial and functional criteria, it is possible to ensure the autonomy of private property symbiotically with the functional unit of the building. This dualistic approach to the internal differentiation of complex property in respect of buildings can be summarized as follows:

Buildings:

a) Space division – Division of the spaces between each private fraction and division between the sum of all the private fractions and the remaining parts that are materially indivisible (we refer here to the stairs, common corridors, roof, entrance, etc.).

b) Functional division – Non-spatial division, whose criteria is the functional character of the building components regardless of their location being within or outside the private fractions. Technically, these components are materially indivisible, and it is not even possible to carry out a legal abstraction for division. In these situations, these components with common functions are mixed within the private spaces, creating an overlap of legal regimes. Any attempt to materially

or legally divide these components would result in the loss of their functionality (we refer here to the building support structure, supporting walls, water supply systems, drainage, electricity system, communications, etc.).

If the approach to the legal organization of buildings had stayed purely spatial, all components essential to the proper functioning of the building within private fractions would be private. That means that the cost of its maintenance would be private but the benefits would inevitably be collective. As a result, there would be no maintenance of common functional components, which could lead to a collective tragedy. Without adequate legal solutions to the factual circumstances of buildings, the towns we know today, although technically possible, would be a political impossibility.

The legal framework of the condominium is a kind of hybrid property; without denying the classic solution of division, it allows the integration of separate and independent fractions with the functional unit of the entire building in a symbiotic way. Its legitimacy was based on its ability to reflect the facts of a complex reality, and to shape the need of property, use and maintenance of the good through an equally complex model of overlap of the two property regimes.

It seems to us that the great innovation was the starting point for the analysis: firstly, the functional unit of the building was taken into account through an identification of the structural elements ensuring safety and operation, and only after this task had been carried out was the space division considered, which enabled goods that are under a regime of common ownership to exist within the private spaces. It was through this internal differentiation that defining and delimiting different responsibilities, duties and equitable contributions to the maintenance and prosecution of common interests were possible. This overlap and coordination of the operations of division allowed symbiotically what was once a theoretical impossibility.

The inadequacy of sovereignty to reflect the real situation in the world is apparent in its inability to reflect the intrinsic factual features of the Earth System as a whole, treating different realities equally.

If we adapt scales and perform the same operation on the common home of humanity, the planet Earth, we find an almost perfect similarity regarding the type of interdependencies established by relations between neighbours who inhabit a materially indivisible building with a functional unit.

The growing disjunction between the functional domain of biogeophysical interconnections and the territorial scope of sovereignty has transformed the classic Westphalian approach into an *ecological nonsense.*[2] The necessary evolution for the concept of sovereignty lies in its ability to integrate the reality of the existence of a *borderless global common* that is not limited to the remaining areas of sovereignty. And from this integration, in turn, must emerge a concept of sovereignty that reflects rather than defies environmental reality (Brunnée 1998). If it is true that international commons are threatened due to technological progress and increased resource competition, and to reach the point where "the international commons must thus evolve to survive" (Shackelford 2008:104), it is equally true that all sovereignties are also threatened by the "global commons" still being subject to a legal uncertainty and unregulated use, as is the case with the Earth System (which includes the climate).

The solution will inevitably be a legal construction, and therefore the technical choices for operationalizing a global response are not different. These choices can result in either a global conflict, as a war of all against all, or the creation of a platform of solidarity, a forerunner of a globally organized society.

A new organization of global neighbourly relations requires an approach with the ability to reflect the overlap of these two realities. For this, a dualistic approach on a global scale becomes necessary, as it takes into account not only the existing territorial division (where global commons are only the remaining areas of sovereignty) but, in an overlapped manner, identifies the functional elements responsible for the state of the Earth System.

Accordingly, the corresponding bio-geochemistry structure of the favourable state of the Holocene period should be identified as the most important common *resource*, which should be the subject of a legal definition and be covered by a legal system regulating its use.

The Earth condominium would then be the legal representation of a reality in which there is a clear overlap and mix between the tangible and intangible dimensions of the Earth System. Legally it would be a juxtaposition between the tangible territorial areas of the Earth System under the sovereign jurisdiction of states, and the entire intangible structure that moves through the atmospheric and oceanic circulation and biogeochemical cycles that, together, determine the movement of energy and materials through the Earth System, and on which it is impossible to carry out any type of ownership or legal abstraction for division, and therefore is truly a common good.

Lacking a physical existence but globally dispersed, the intangible elements of the Earth System are, albeit on a temporary basis due to their permanent movement, within the sovereign space and should be under the regime of an intangible natural common heritage of all humankind / or World Heritage.

In this juxtaposition between space sovereign jurisdiction and the common system should be a model in which the common intangible natural heritage/World Heritage represents the functional unit of the Earth System that blends into the airspace and ocean spaces of sovereignty but, by referring to a particular favourable structure of biogeochemical elements, a different plan of sovereign powers arises, and may be summarized as follows.

Planet:

a) Spatial division – Territorial division between autonomous sovereignty and its delimitation in regard to all the remaining parts of sovereign jurisdictions (high sea, seabed, Antarctica). This is the type of classic territorial division in relation to the physical planet of 510 million km^2, resulting from the existing geopolitical map. This operation of dividing the *res corporales* includes also all airspace of the sovereign States, the water column of the territorial seas and exclusive economic zones.

b) Functional division – Refers to the distinction between tangible components of the Earth System (*res corporales*), where the territorial division between States is performed, and the intangible higher level (*res incorporales*) of the Earth System, which refers to the elements that compose the biogeochemical structure of the system, both working synergistically to keep the system in well-defined states. The higher level is an emerging phenomenon resulting from the interaction and integration of the geophysical properties of the planet with the living biosphere, which forms the intangible Earth System. It is a single global system incapable of any legal abstraction of division, simultaneously inside and outside of all States, and therefore it is common to all humanity.

Within each state there exist ecological infrastructures of the living biosphere and geophysical elements, which, through the Earth's history, were (and still are) the *source*

of the favourable state of the higher level. In this regard, ecosystems that are located within the jurisdiction of states provide global ecological services that are functionally common because they are dispersed globally.

Consequently, the benefits provided by ecological infrastructures inside sovereign territories that contribute to the maintenance of this ecological safety space of humanity are ecological services of global common interest. That is, as a result of the overlap of the common intangible heritage and territorial sovereign spaces on a global scale, it would be possible to include in the intangible heritage the benefits that ecosystems perform in the state of the common system.

It is in this overlap between the intangible elements of the Earth System and the sovereign rights exercised on the territories where the *sources* that contribute to the maintenance of the *living space* are located, as well as the human infrastructures that use this living space, that will definitively mark the character of this globa*l res communis*, which mixes sovereign territories with a common system, with benefits and damage that are shared globally.

In this context of interdependence between the interests of all humankind and state interests, the proclaimed necessary evolutions of the concepts of CHM, CCH, World Heritage global commons, sovereignty and international law will only be viable if they carried out in a theoretical context that recognizes, reconciles and synthesizes through a *res communis* the representation of this overlap of interests and the respective legal regimes.

Among the existing models, the only model able to describe this integration and overlap of two possible different legal regimes is the condominium. With the already proposed legal separation between the territorial dimension of the planet and the intangible elements of the Earth System, and through an accounting system to assess the inputs and withdrawing of the common intangible heritage, it's possible to bring ecological reality and sovereignty rights closer together, building a global condominium where the common interests of humankind are organized in symbiosis with state interests.

The application of this model on a global scale results in the recognition that the international society is neither a community nor an arithmetic sum of sovereignties. It is something complex that should elevate the law to the art of reconciling the extremes, of making symbiotically dependent what was apparently incompatible.

Accordingly, we can say that the functional unit could be ensured through the internal differentiation of legal regimes between the *res corporales* and the *res incorporales* of

the Earth System. However, despite a globally organized society having dealt with ethical, philosophical and legal arguments, and whose cooperation today is already extended to scientific knowledge, to be more than an idea, it will have to be institutionalized and an accounting system found that matches the internal unity of the system to an internal equity of human relations established through the common use of the Earth System.

5.6. Symbiotic Sovereignty

The concept of sovereignty has its origins in a matrix incompatibility with the unity and interactive character of the Earth System. After discovering the conceptual disintegration of sovereignty regarding where the concept is applied, old paradigms were transformed into paradoxical uncertainties. Its existence is exercised in a contra-natura tension, ranging from the reaffirmation of political authority and the dilemma of the effective impossibility of sovereignty being free of the ecological interdependencies that drive all states to almost the same level of interdependence, regardless of their technological or economic development. The language of mutual and binding interdependencies is hardly explained by international law. When a reality does not fit into our abstractions, the solution is often the simple nomination of the impossibility of understanding the problem. This strategy has a double purpose: it not only serves as the way of explaining the inexplicable but also serves to create the illusion that the designation of the "complex" is a synonym of its clarification.

Constructing legal abstractions (boundaries) in the lower level of integration of the Earth System can lead one to believe that those mental abstractions are reality itself. Although we see clouds, rivers and ocean currents crossing all borders, the lack of knowledge about Earth System functioning, with all its interconnections and emerging phenomena (which give it a characteristic of indivisible unity), was a key factor in the construction of this process of mental divisibility.

The confusion between social abstractions and the systemic reality of the planet soon made evident how difficult and serious the consequences of failing to harmonise social representations with natural reality are. Making non-existent, for practical matters, all reality that does not fit in the divisions that organize our perception of the world created a structural difficulty in clearly explaining the contradictions, paradoxes, dilemmas, interdependencies and improbabilities that are the origin of life.

These are strange and difficult realities not only for law to clarify in all of their dimensions but also for natural sciences, which had to find new words and concepts for the apparent intrinsic contradictions of relationships that apparently revealed opposites or the opportunistic. These relationships of mutual benefit and dependence were called symbiotic. In some cases, these relationships of interdependency imply such an intimate interrelation among the organisms involved that it becomes mandatory, meaning that both symbionts entirely depend on each other for survival. Non-acceptance and non-harmonisation of these dependencies correspond to mutual self-destruction.

In fact, the main feature of the interdependence is the inability to pursue any of the interests in conflict without simultaneously pursuing, or at least serving partially, the apparently opposite interest. Paradoxically, the consequence of the *failure of coordination* is the deepening of the dependence. The global ecological relationships are obligate, meaning that the inter-relationship between individual and collective interests on any scale, even the global scale, are profoundly intimate and become materially mandatory; that is, it becomes a non-derogable interdependence and humanly unavailable. When this "law of nature" does not match a socially structured organization, it becomes a real political impossibility. At the level of interstate relations, this phenomenon manifests itself through the “sovereignty paradox” (Kaul 2013:27), which demonstrates that states lose sovereignty through non-cooperation.

In this field of contradictions and complexities, it is essential to analyse the different elements of sovereignty and their interrelationships. Considering that territory is a crucial anchor for global or local analysis (Albert 2007), we also need to understand that this is not its only dimension. We need to ask:

a) Which elements of this collective identity lead to the perspective of sacred (absolute) sovereignty?

b) To what extent does this absolute, almost sacred character that underlies the pursuit of individual interests of the state to the detriment of global collective interest, actually depend on the present and future interest of humankind as a whole?

For Eduardo Lourenço (1999), each people just *is,* by conceiving and living itself as destiny. Symbolically, it means as if it always existed, carrying with itself a promise of eternal existence. It is this conviction that delivers to each people and culture (both being inseparable) what we call identity.

This interesting and profound definition completely ignores the territorial dimension of this identity, and without wishing to diminish its importance, it is certain that some people exist without territories, and territories without people. Equally interesting is the importance of the temporal dimension in the formation of this "conviction" that is transformed into identity. The perception of ever having existed and a destiny or promise of eternal existence put the projection of the past towards an unlimited future into the centre of collective sentiment, offering people that which is called identity.

In this sense, territory is much more than a merely physical connotation. It is a consequence of life in society, so that social relations are essentially projected towards a concrete territory and unlimited time. It follows from the above that the sacred character of physical territory of a nation-state comes from the operation in a specific space of this symbolic dimension projected towards an eternal future.

If this symbolic projection of an eternal future is only possible in the context of interdependence between all people and the mutual dependence of all people upon a specific state of the Earth System, then the possibility of a people's sovereignty will require the creation of a *common intangible living space* where all people can develop this "long-term" unlimited temporal projection. Without it, no sovereignty would make sense.

Consequently, there will be two structural requirements for the emergence of any kind of community:

- the need for a *locus* as the stability element for building a political organization;
- the need for a temporally unlimited projection of each people in a subjective dimension.

Therefore, the subjective dimension of identity includes, in its genesis and substance, the conviction of an existential possibility temporally extended to the successive chain of generations yet unborn. So, we can say that *the future healthiness* of a certain territorial space where the social formation is located is included in the preconditions of sovereignty. The global nature of the "environmental good" transforms the scale of the future *state territory healthiness* into the *healthiness of the Earth System*. Each social formation designed in a particular territory is inevitably integrated into the whole human family, current and future, and therefore has a mutual and global interdependence. This fact transforms the absolute contraposition between autonomous collective interests of

humanity and the individual subjective interests of each state into a new context: the benefit of each state lies primarily in the implementation of the common interest or, to put into a narrower context, at least while the benefit of each state does not jeopardize the complex balance that sustains what we call the common interest. And this relationship between the territorial sovereignty and the healthiness of the global *living space* is symbiotically necessary.

5.7. From Complex to Symbiotic

Although inextricably linked, sovereignty is not in essence only territory. It simultaneously contains elements that open sovereignty to the global, to future generations and to the *common interest of all humankind*.

The proof of this is that since the 1648 Treaty of Westphalia, the first exception to the principle that in international law there is no autonomous existence beyond state-centred international relations was the common heritage of mankind.

> The primary exception to this principle is the international commons. In these areas, which include the deep international seabed, the Arctic, Antarctica, and outer space, concerns over free passage outweighed the great Western powers' territorial ambitions and Grotius's *mare liberum* triumphed. As a result, these regions were gradually regulated to a greater or lesser extent by the Common Heritage of Mankind (CHM) principle, in which theoretically all of humanity became the sovereign over the international commons. (Shackelford 2008:2)

This exception to the principle of territorial division had its origin in a historical cultural process based on the ethical perception that there is a common heritage of all humanity corresponding to the fundamentals of life and to the renewal cycles of nature, which also includes the temporally unlimited projection of each sovereign identity. We can state that the CHM has always existed latently on a higher level to the plan put into effect. That is, the foundations, the initial booster reason has always been broader than simply looking for a legal framework for the remaining parts of the territorial divisions. However, because the scientific tools to define and delimit its implementation were absent, it was carried out in an amputated form and in an adverse context. But it is not because it is not recognized in its true dimension that it ceased to exist and the interdependencies allowed themselves to manifest.

Not to recognize and accept these dependencies is to make them paradoxical, complex and deeper.

Humanity, as an integral component of the Earth System, is immersed in a necessary symbiotic relationship with the Earth System. The sovereignty is the human manifestation of the political organization of peoples exercised within the Earth System. The symbiotic relationships include those associations in which one organism lives on another (ectosymbiosis) and where one partner lives inside the other (endosymbiosis).

The exercise of a symbiotic relationship requires coordination of actions mutually beneficial for the relationship but because they are mandatory, no coordination gives rise to a mutual destruction.

Regardless of the system of internal self-organization with which humanity regulates, organizes and coordinates the use and maintenance of the system in which it operates, it is necessary to find a source of political legitimacy to build this process. It can only be found in the existing political organization, within states' political authority.

> The figure of the 'international' represents sovereignty as inextricably linked to a given territory. Yet 'international relations' must not be understood as the area of politics among States, assuming that within States political authority rests on their sovereignty. Rather, seen from the vantage point of political theory, the figure of international relations is more: it does offer a powerful solution for a central problem of the political, namely the problem to provide a place in which political authority *ultimately* rests, yet *at the* same *time* it hides the fact that this 'ultimate' place is in reality highly contingent. It is in this sense that the figure of international relations allows to combine the political system's *inside program* of producing the legitimacy of political authority with the political system's *outside program* which insinuates that this political authority in need of permanent production and reproduction is fixed against its environment (of other loci of political authority). (Albert 2007:53)

This proposed evolution of sovereignty is therefore a natural consequence of an attempt to achieve the CCH through the deterritorialisation of CHM/World Heritage. Symbiotic sovereignty is the evolution that recognizes, reconciles and synthesizes the overlap of the territorial and non-territorial elements of sovereignty that exist symbiotically inside of all states in a single overarching governance condominium.

In this sense, the evolution of the theoretical concept of sovereignty turns out to be just a reconstruction because the issues on which it could potentially be considered a retreat in sovereignty actually had never been in the states' sovereign jurisdiction, because no state alone can address this issues. Sovereignty is transformed without losing its essence. On the contrary, only by harmonising the interdependent relationship between all sovereignties and the Earth System will be possible to perform the non-territorial element of each sovereignty. We can argue that this *common intangible living space* is the summation of all the unlimited temporal projections of all the sovereignties, in which theoretically all humanity became sovereign over the intangible components of the Earth System as the common natural intangible heritage of humankind.

The absence of the temporally infinite projection confines sovereignty to the territorial element. And it would be the emptiness and the absence of any sense.

We could briefly review some features of symbiotic sovereignty:

1. Symbiotic sovereignty, as opposed to the absolute sovereignty [which incidentally has never been more than an ideal] of Westphalia, integrates a knowledge that absolute sovereignty did not have about the territory as a "live" system of relations flows of energy and matter (including biologically organized matter).

2. Symbiotic sovereignty does not abolish territorial sovereignty but changes its nature and its mode of exercise because it includes in its formula the non-territorial element, temporally unlimited, common to all states, which will be the legal basis for building an equivalence platform through the accounting of compensations and penalties.

3. Territorial sovereignty is maintained as part of the symbiotic sovereignty but under two principles of conditioning that should be the subject of a binding international regime: a) territory uses may not harm the global common Earth System software or, through it, cause damage to the territories of the other symbiotic sovereign states; b) uses of the territory may not limit the choices of future generations [intergenerational justice].

4. Territorial sovereignty, enriched with this restriction of use, is not a minor harm but a good to be stimulated. It corresponds to a demonstration of the classical principle of subsidiarity. In this light, the territorial sovereignty must be understood as the best way for humanity to be able to inhabit the planet sustainably, making it a co-sovereignty. Only through many sovereign "properties" (and not a mega-state that would eventually be totalitarian) can we care for the Earth, moving from a predatory relation to a synergistic relationship.

5. In fact, only in the context of this new territorial sovereignty, symbiotically transformed, will be possible to find a basis in law for the construction of a system of compensations and penalties, which is an incentive for states to produce positive externalities (receiving rewards) and reduce the negative externalities (avoiding fines).

6. The institutional problem of public international law and constitutional law that remains open is that of conferring to the United Nations not a part of world government but a political, legal, scientific and financial status to allow it to be it the entity that coordinates and administers this compensation system, that sets and installs policies that stimulate the correction and redefinition of the self-regulatory mechanisms.

5.8. Earth System Stewardship

The structural evolution of the recognition by international law of this legal global object would have cascading consequences, of which for the moment we highlight only two:

1) The common interest of all present and future humanity (which is coincident with the trans-temporal dimension of sovereignty) would exist via their representation in a common natural intangible heritage;

2) From the moment the intangible Earth System belongs to someone (in this case it belongs to all humankind as a *res communis omnium*), its use should be governed as a trust by a *specific law*.

In other words, it would be possible to discern one of the possible objects of the so-called global governance. The use of the word *governance* assumes that the object of the act of managing/governing is identified and defined. This definition can either have a territorial or a functional scope. In the absence of a defined object and a clear separation of powers among the matters that must necessarily be governed globally and the articulation/coordination with traditional powers of states, we need to admit the unavoidable emergence of modalities of uncoordinated and unregulated use and the impossibility of collective action.

Taking into account the relationship between appropriable *sources* and inappropriable *resources* dispersed globally, and the fact of the *living space* being an emerging result

from the integration of the geophysical properties of the planet with the living biosphere, we can state that the intangible favourable state of the Earth System is a space of biogeochemical flows, whose maintenance of a certain structure of concentrations within the limits corresponding to the stability period of the Holocene is vital for humanity. Recognizing this safe space for humanity as a common natural intangible heritage of humankind would allow capturing and accounting intangible flows (positive or negative for the state of the common heritage) that all human actors emit in different amounts.

According to Carl Folke (2011:8), "A significant part of this challenge is to make the work of the biosphere visible in society, in human actions and in financial and economic transactions".

Since most of the benefits provided by *sources* (ecosystems) are legally nonexistent due to their global dispersion, only a comprehensive legal support can give visibility to these positive flows. That is, due to the fact of these benefits being global, in order to stop them being "externalities" for the economy and instead become visible to society, it is necessary to first recognize their legal existence; only then may they be subject to valuation. Since all people on a global scale enjoy these benefits, and many of them are provided by *sources* (ecosystems) located in territories under sovereign jurisdiction, the state in which the *source of positive flows* is located should be financially compensated.

A structural condition for reaching the civilized journey from explorers and exploiters to guardians and managers is that the benefits achieved from the state of the Earth System do not constitute losses for the societies that perform them. According to the primitive accounting economic methods still prevailing, the value of a forest only enters into the GDP and becomes visible in the financial and economic transactions of society the day that forest is destroyed and turned into "raw material".

Changing this formula and assigning an economic / financial value to the ecosystem service requires a legal solution that recognizes the social existence (legal) of the benefit. Only non-territorial legal support can uphold global benefits, and, as a consequence, financial and economic visibility may be possible. The economy cannot consider as a credit a benefit that legally does not exist.

It is no longer about simply controlling polluting emissions; it is necessary to build an economy that is able to recover the natural capital that has been destroyed and create a permanent system of *sources renewal* that assures the maintenance of the common intangible space within the limits that humanity should not surpass. This system can only be achieved on the scale required if the maintenance and reconstruction of the sources do

not constitute a cost or loss to the state exercising sovereignty over the territory where that source is mainly located. Without an international ecological accounting system, where individual contributions and obligations towards the maintenance of the intangible common heritage are clearly defined, there will be no recovery and preservation. No one would undertake such tasks when the cost of doing so is private but the benefits collective.

The shift from an economy of exploration of resources and sources to an economy of production of common resources implies not only the existence of a common intangible heritage on a global scale but also an accounting system of global biogeochemical flows in a wider system of international compensation.

The introduction of benefits in the system of accountancy of ecological flows could have a trigger effect in the sense that for the first time the production of common benefits could have some individual (state) compensation.

When communities, regardless of their size, share the use of the same vital goods, they are faced with the need to create a system of shared management. As such, it is essential to compare the different benefits and the consumption by each of that common resource. The common heritage is this intangible space, where accountability should be kept by an international institution (UN) with functions of coordination; that is, if we have a system of compensation between the different performances of each state on the state of the Earth System, each state will try to have the best balance (difference between positive and negative inputs) mainly through self-regulation. To achieve that goal, , the condominium governance model, as a universal model optimized to manage global flows in a system of international compensation, should be guided by the following principles:

No Winners, No Losers Principle

In a condominium governance model, the one who deserves to receive compensation for the benefits provided to the common heritage is not profiting from it. It is just being reimbursed for the improvements in the common good enjoyed by everyone. Those who contribute to that compensation (through the condominium bodies) are ensuring the healthiness of their own territory and protecting the core element of a temporally unlimited projection of their own sovereignty. We live in a symbiotic mandatory condition where we are all either winners or losers.

Common Intangible Living Space

We could not protect the emergence of a favourable state but we could protect the biogeophysical conditions that assure the maintenance of the favourable state of the Earth System.

The *remaining ecological space,* scientifically represented by the *safe operating space for humankind of planetary boundaries*, which coincides with the *living space* of the CCH concept and also with the non-territorial dimension of the CHM, is the fine-tuned version of the *res communis* well-defined favourable state of the Earth System in light of contemporary developments.

Global Condominium

Global neighbourhood relations are not relationships of power and domination but ones resulting from the use of the same indivisible resources. In the Earth condominium, all humanity, present and future, becomes co-sovereign over a well-defined favourable state of the Earth System: it is a non-spatial CHM. The condominium is the only type of *res communis* with the ability to represent the overlap of autonomous sovereignties over a global common good; it is not restricted to the traditional global commons but spans across areas subject to national jurisdiction. In a condominium model, the existence of (i) an equity criteria to ensure the fair contributions of each co-sovereign and (ii) an institutional arrangement with coordination functions for maintaining the functionality of the common home of humanity are necessary.

Sources and Resources

The favourable conditions of the Holocene arose in an evolutionary fashion throughout Earth's history and it is through this evolutionary process involving the living part of the planet as well as the geophysical hardware that, for example, the relative concentrations of gases remain relatively constant throughout time. In essence, it is the integration of the geophysical properties of the planet with the living biosphere that forms the intangible Earth System. Thereby the *source* of this favourable state is appropriable (the ecological

infrastructures are under the territorial jurisdiction of states) and the *resource* (the favourable state) is inappropriable; that is, the resource disperses all over the planet and its appropriation is physically impossible, as is also any legal abstraction of division.

Occupation of the Common Intangible Living Space

The over-use of the favourable state of the Earth System, although not corresponding to a physical appropriation, can lead to the exhaustion of the intangible living space. With climate change comes the discovery that a stable climate is not an inexhaustible factor, that is, the incorporeal biogeophysical conditions that determine the state of the Earth System have upper and lower limits and, therefore, are exhaustible. The occupation of this resource is not realized through a physical appropriation but rather through a change in the qualitative state of the incorporeal characteristics of the Earth System. This occupation of the remaining living space is the result of a chemical change in the qualitative state of the intangible space, and affects its common use.

a) Enlargement of the Common Intangible Living Space

The ecosystem services of global common interest are all the biogeophysical processes performed by the ecosystems that contribute to the regulation of the stability of the Earth System within the safe operating space. These services, although they originated in ecosystems located in territories under the jurisdiction of sovereignty states, are spread diffusely in the Earth System and enlarge the remaining *living space* where all nations and citizens of the world operate.

b) Credits over the Common Intangible Heritage

The contribution of ecosystem services of global interest to the maintenance of the favourable state of the Earth System should generate credit on behalf of the state that exercises the sovereignty or sovereign rights over the *source* of this benefit, that is, the ecosystem infrastructure that provided those ecosystem services.

c) Debits over the Common Intangible Heritage

The more chemical, biological and physical processes, resulting from human activity, push the Earth System out of the safe operating space, the “less resource” (considering the favourable and stable state of the Earth System as a resource) will be available to all agents.

Because these processes contribute to the depreciation of the state of Earth System, and correspond to an occupation of the intangible *living space*, they should generate a debit on behalf of the state that exercises the sovereignty or sovereign rights over the place where this activity occurs.

d) Standardize to Compare

It is necessary to build a common standard pattern that represents the positive and negative flows of each country on the structure of the Earth System. Conceptually, this new metric should be an aggregation of indicators that represents core processes that regulate the stability and resilience of the Earth System. Only by placing the various benefits in a common metric compatible with its consumption, can we express, to their full extent, the relations to be harmonised. This new metric should be based on the best available scientific knowledge.

e) Life Intangible Support Unit – LISU

The common standard pattern could be named LISU (Living Intangible Space Unit) and should be an aggregation of PB indicators (“control variables”): stratosphere ozone depletion, aerosol loading, climate change, ocean acidification, biogeochemical flows (e.g., nitrogen, phosphorus), novel entities, biosphere integrity, "land-system change" and "freshwater use".

f) Ecobalance

The difference between the production of positive biogeochemical flows and the emission of negative flows of each state and the impact of it on the maintenance of safe operating space of humanity should be the basic equity criteria of contributions for the Earth Condominium. The balance between the generation and consumption of LISU’s is

the ecobalance. It allows us to realize the status of the relationship of each state with the common heritage, and a structural condition for confidence building.

g) Legal Foundations of Contributions and Compensations

The legal basis of the obligation to contribute to the maintenance of the Earth System's state is the fact that all states use within their sovereign territorial space a good that is under a co-sovereignty legal regime.

The legal foundation of the right to be compensated for having contributed to maintaining the intangible living space is that this favourable state of the Earth System is under a co-sovereignty legal regime, and is also inside sovereign territorial spaces. All the sovereignties will benefit from the enlargement and maintenance of the remaining living space.

h) Agreed Value for each LISU

Using all the best available economic information about the cost of environmental damage and the benefits of ecosystem services, we must construct monetary value for the production and consumption of each LISU. This value must be sufficient to stimulate the activity of producing positive flows for the common system, and not constitute a financial loss for societies that develop those activities. It will be defined through a convention.

i) An Intermediate Space

Only by building a global system capable of crossing, in a comparable manner, the positive and negative flows can we build an equivalence platform of fairness and reciprocity, where all actors can see their interests safeguarded. In the current attempts to organize the collective use of Earth System, positive flows to a favourable Earth System are not yet part of the accounts.

It will be an intermediate space between State parties, where each one could understand the contributions from all the others and define its own performance strategy in relation to the common heritage, taking into account the prediction of other states' behaviour.

j) Coordination Functions

With the definition of a new object of law and governance, a new or a reconverted international organization (UN) should form. It should have the capacity to address the Earth System as whole, tackle the sort of challenges we are facing, and assure coordination tasks. Such functions should consist of receiving and redistributing the contributions of each State party and gather the different interests then negotiate and adopt the necessary resolutions. Failed coordination would result in high costs for all parties.

k) The Positive Competition

All parties, depending on internal policies, might improve their balance relative to the common heritage through the encouragement of environmental efficiency and the preservation or restoration of ecosystems.

l) Ecological Trust Principle

The concept that best translates the idea of sustainable use of this common intangible heritage by present generations with preservation for future generations in mind is the concept of ecological trust. This trust is the juridical figure with the best capacity to fit the virtual tri-polar relation established between different generations as an object encumbered with the duty to keep within the limits of the favourable state of the Holocene. The elements of trust are:

- Past generations (Trustors);
- Present generations (Trustees) – but we need a governance mechanism here. For example, states acting within tight constraints via a revived trusteeship council; also using own sovereign territory in a way that is consistent with trustee obligations/responsibilities;
- Present and future generations (Beneficiaries) – current use rights and inheritors, etc.

5.9. Final Remarks

As Vandana Shiva (1999) explains, "The 'global' in the dominant discourse is the political space in which a particular dominant local seeks global control, and frees itself of local, national and international restraints". Therefore, Shiva continues, "the global does not represent the universal human interest; (instead) it represents a particular local and parochial interest which has been globalised through the scope of its reach". Although humans live in a global political space, they are fundamentally local beings. However, they are also creatures who can create a new type of political space which is not global or local but is a SHARED political space as an intangible locus, where humanity as a whole, present and future, harmonise their different contributions to the common good and ensure the necessity of each sovereignty for the unlimited timescale identity. The recognition of one global legal support and an accountability of biogeochemical global flows in a system of international compensation is a pre-structural-condition for a dialogue between present living humans and the unborn.

Now we have the access to the central computer of Spaceship Earth, the condominium it seems to be the conceptual legal framework for the Anthropocene, where we can get inspired to organize our global neighbourhood. And the ecological neighbourhood is not a relation of power dominance. It's a relationship of symbiotic interdependence, where the military or economic powers are not the only factors on the game. I believe that the common natural intangible heritage of humankind is also the political space of the Spaceship Earth Condominium, where we can decide how to conduct our own collective action as neighbours.

Chapter 6

Earth Global Challenges Prize: A New Shape

TITLE OF THE ENTRY: CONDOMINIUM: THE LEGAL FRAMEWORK FOR THE COMMON HOME OF HUMANITY

AUTHOR: PAULO MAGALHÃES IN COLLABORATION WITH ALESSANDRO GALLI, WILL STEFFEN, KATE MEYER, LEENA YENGAR, ALEXANDRA ARAGÃO

6.1. ABSTRACT

Planetary Condominium: the legal framework for the Common Home of Humanity

One of the most crucial challenges of the Anthropocene is to reconcile the rigid dichotomy between two key diverging approaches for the governance of the Commons: on one side, the classic view of Hardin calling for division and private property rights as the only way to avoid the "Tragedy of the Commons"; on the other, Ostrom's suggestion of coordinated actions for community-based management of common-pool goods and resources.

Both views, at a global scale, have been derived from a society that is territorial, which considers "the commons" to be that which is leftover from sovereignty or private property. From a legal viewpoint, the Planet has so far been treated as a ***geographic*** territory divided among States and the remaining territorial *global commons*. This over simplified one-dimensional view leaves out the core expression of nature – the ***functional*** Earth System as a single, complex life-support system. As such, we argue that the favorable Holocene-like *state* of the Earth System – i.e., the set of interacting physical,

chemical, and biological global-scale cycles and energy fluxes that allow life on the planet – is humanity's ultimate global common that is an intangible and legally indivisible good, which the science of the Planetary Boundaries (PB) framework clearly defines as the "*Safe Operating Space for humankind"*.

The global and non-territorial nature of this *intangible space* coupled with the territorial nature of sovereignty and private property require the views of Hardin and Ostrom to coexist.

To achieve this, we propose up-scaling the legal model regulating human interactions in condominiums to the global level: A condominium is an object with a unitary structure and common functional systems, which belongs to various co-owners; each co-owner has private or exclusive rights of ownership over determined fractions (e.g. apartments), while sharing ownership over structural elements (e.g., foundation) and functional systems (e.g., electricity). This is the only legal model that, using functional and spatial legal divisions, allows different legal regimes to coexist within the same physical space.

We argue that the functional and spatial divisions found in a condominium are almost perfectly similar to that of the territorial spaces of the Planet and the functional indivisibility of the Earth System. Thus, for the functional and spatial divisions to co-exist in a Planetary Condominium we propose a) recognizing the legal status of the Holocene-like state of the Earth System as a Common Intangible Natural Heritage of Humankind, b) using the Condominium framework to solve the overlap between this heritage and State's territorial jurisdictions, and c) using Ostrom's design principles to ensure the maintenance of this Heritage.

The key outcomes expected are:

1. Autonomous legal object of governance, complementary to sovereignties: the Intangible Common Heritage of Humankind;
2. Institutional framework with the mandate to govern the management of the Earth System and Global Catastrophic Risks (GCR);
3. Recognition of the intangible global biogeophysical cycles as part of our heritage, allowing positive and negative global "externalities" to be accounted, internalized and managed;
4. New Earth System Accounting Framework based on Planetary Quotas, that can represent all scales, from individual and community, to regional or national;

5. Economic compensation scheme based on the balance between negative and positive "externalities" and incentives to promote an economy that pro-actively maintain the Earth System;
6. System for financing the management/protection of the Commons at the global level;
7. The ultimate recognition and safeguarding of rights of future generations within the international legal system.

Like in the Condominium model, the mission of keeping the common systems in a functional state should be institutionalized. We propose the revival of the UN Trusteeship Council (TC) to host this mission – working under the umbrella of the Security Council as per the UN Charter – for four reasons: 1) It is one of the six main UN organs; 2) the scope of its mandate is global; 3) its revival would not require drafting a new UN Charter; 4) its original mission (administer trust-territories) is analogous to that proposed here, i.e., trusteeship of non-territorial global commons (Humanity's Safe Operating Space). The revived "Trusteeship Council for the Earth System and the Global Commons" would be the place where local actions get global visibility. TC would become the chief forum for dealing with GCRs and other trans-national matters.

In this new role, half of TC would be composed of representatives from UN member-states and the other half by specially qualified members of civil society nominated by each Member-State. A permanent Scientific Commission, elected by the TC, would guide the work of the TC by continuously monitoring State appropriation and preservation of the Planetary Boundaries. Its composition would be interdisciplinary with experts representing PBs, and appointments of Earth Science experts, ecological economists, ecological lawyers, and experts in GCRs and social sciences.

The TC will deliberate on priorities for Global Commons and GCRs, such as: strategies for the proactive management of each PB using systems of penalties and compensations; rentals for using global commons; and, transaction fees to finance the management of the Commons.

The initiatives first actions would be the conceptual breakthrough of recognizing global commons spanning across multiple national jurisdictions, as a single legal object. By capturing the most important bio-geophysical cycles in the new intangible legal

object, it would be possible to integrate Earth System dynamics within economics to create the ideal economy where the provision of positive bio-geophysical processes is synonymous with economic benefits.

The Planetary Condominium model details spatial, functional, and temporal dimensions to addressing humanity's defining challenge: to maintain a favorable state of the Earth System for the continued success of humankind on this Planet.

The proposed model integrates and builds on several mechanisms that already exist, to make tangible, the intangible concept of the Common Heritage of Mankind. This will represent a significant evolution on humankind's civilization journey, from explorers and exploiters, to guardians and managers of our Common Home.

6.2. MODEL DESCRIPTION

6.2.1. The Planetary Condominium model: the conceptual framework for a new global governance.

The Earth System is a single and deeply interconnected whole and needs to be represented for its multi-dimensional qualities. Climate change, biodiversity loss, water shortage, food security, pandemic diseases, and many other large-scale problems are, directly or indirectly, the consequence of the lack of a comprehensive and interactively organized governance system. As Kul Gautam (2016:263) best explains it, "Our understanding of the Earth System today is vastly ahead of our organizational capacity to […] manage it" and thus "we need to make a quantum jump to a whole new mode of managing the Earth System".

The favorable Holocene-like state of the Earth System - today identifiable through the Planetary Boundaries (PBs) framework, (Steffen et al. 2015; Rockström et al. 2009) - is a global intangible good, which is impossible to legally divide and privatize. This "legal indivisibility" has become one of the most daunting challenges for a globalized society

that regards the management of common goods as something that inevitably results in a "tragedy of the Commons" (Hardin 1968), and which considers the regime of division, private property rights and markets mechanisms as the sole way to solve this inevitable tragedy. According to Hardin, if placed in a regime of free access to common goods and resources, each individual will act independently in the pursuit of self-interest, motivated by the goal of maximizing individual benefits, despite the fact that the collective result of such individual action is the sub-optimal use of resources and overexploitation of the commons that inturn impact everyone. This dominant underlying reasoning continues to misrepresent the concept of the commons as an open-access regime, operating in a free-for-all scenario where there are no boundaries to the usage of a common, no tools for monitoring such use or rules for managing it, and no cohesive representation of the community of users.

Elinor Ostrom (1999) pointed out some basic design principles for successful commons' management, and debunked the established paradigm of fatality: a properly managed common has boundaries, rules, monitoring of usage, punishment of free-riders, and social norms. Moreover, being a "common", it requires the existence of a community willing to act as a steward of its own Common Pool Resources (CPRs).

A functioning Earth System is indeed humanity's CPRs: as such, what is at stake is not "saving the planet" but rather maintaining the Earth System in that specific state – the Holocene-like state – that is acknowledged to be favorable for humankind to thrive. Our "home" relies on favorable, life-supporting intangible conditions and therefore a planet outside such favorable state cannot serve as our "Common Home".

As humans, we live simultaneously in two different types of communities of interests: one at the level of national societies and the other at the global community level. But unlike the national communities organized in territories, the global community of humanity, is something that, having no personality, appears non-existent and therefore, cannot be titled with any definitive rights or representation.

The "territory" of humanity is the planet, and this fact goes beyond the nation-state based governance. Humanity hasn't yet a *locus* from which it can base an organized global stewardship community.

One of the main results of this incapacity is the basis of another fundamental question of regulation and collective control: "*How can a good that belongs to no one be subject to a legal regime*?" (Kiss 1982:122). In other words, is it possible to regulate the use of a functioning Holocene-like state of the Earth System if this belongs to no one and doesn't

have any legal recognition within human societies? How can we manage and protect something that is intangible, global and not legally defined?

Until now, the legal non-existence of the intangible functional structure of the Earth System has resulted in a model of social organization in which planetary biogeophysical processes are "invisible" to the economic processes; they are considered “externalities” to our societal organization, despite being key vital factors for humankind.

The biogeophysical structure of the Earth System throughout the Holocene epoch – i.e., the set of interacting physical, chemical, and biological global-scale cycles and energy fluxes that provide the conditions for humans to thrive on the planet (Oldfield, F. & Steffen 2004), *belongs intuitively to all humanity in common*. This means that such an Earth System structure cannot be owned, enclosed or appropriated by any State or entity. “As a commons it can be used, but not owned, either as private or common property or via the claim of sovereign rights” (Taylor 2016:117). These characteristics of *belonging to all but being owned by none* do not necessarily prevent the Holocene-like state of the Earth System from being used in an organized and regulated way and passed on, unaltered or enhanced, to future generations.

The transmission of a value is the main purpose of the concept of heritage. The principle of intergenerational equity and the existence of the ‘right’ of future generations to receive and enjoy a functioning global ecological space confer an inheritable dimension to the favorable state of the Earth System. As it belongs to all humankind - present and future generations - as a common heritage, it should be governed in accordance with some basic design principles of successful commons management, along the lines of the innovative theories of Ostrom(1999).

However, the technical obstacle preventing the recognition of the favourable state of the Earth System as a heritage - and thus the construction of an adequate management system - is the fact that this “intangible natural good” cannot be defined by the traditional understanding of the term “global commons”, as it seamlessly overlaps with man-made jurisdictional boundaries – the geopolitical boundaries of nation states. This is a novel situation for the current model of international law, which is unable to interpret and reconcile the intangible functional system of the planet with the tangible sovereignty of states.

Fortunately, the problem of reconciling seemingly opposing interests in a situation of symbiotic interdependence is not completely new to legal sciences as an example can be found in the legal model of a condominium. This model defines a situation in which an

object with a unitary structure and common functional systems belongs to various co-owners, where each individual has private or exclusive rights of ownership over determined fractions of the object, while at the same time co-owns the structure and systems that constitute the object's common functional elements.

On further analysis of this legal construction surrounding our daily life, we realize that such a model offers boundless possibilities of management while challenging the conventional paradigms of international law:

1) Condominiums represent not just a space-based division but also a legal division based on structural functions: stability (e.g., foundations), systems of common use (e.g., water, electricity, elevators) and functional elements (e.g., stairs, roof, some of the windows). All elements that ensure the habitability and safety of the building, and on which it is not possible to carry out any legal operation of division or aproppriation - not even abstract – are under a legal co-ownership regime.
2) Within the spaces that are under the legal private property regime, there are elements and systems that are also under the legal regime of co-ownership (e.g., some structural walls, water system). This means that by using different types of legal division (functional and spatial) it is possible to ensure the coexistence of different legal regimes, which are usually incompatible, within the same physical space. This is the uniqueness of the condominium model.
3) If we add to this differentiated division a system of equitable contributions from each co-owner to ensure a permanent management of the common systems and structures, it is possible to harmonize the interdependence between the individual property interests and common interests.
4) The existence of these two legal regimes in the same physical space do not compete with each other, nor does common property limit the full power of private property; conversely, the existence of a common property, superimposed on private property, has the mandate of solely ensuring the maintenance and long-term functionality of the systems and structures that all individual owners depend on.

With a proper adaptation of scales, the legal model of the condominium thus provides us with a solution for the legal organization of human societies at the scale of the planet.

The legal framework of the Common Home of Humanity is essentially that of a Planetary Condominium.

In such a Planetary Condominium (Magalhães,P. 2007, 2016), the tangible geographical planet – on which abstract legal divisions are possible (boundaries) and where territorial sovereign powers are exercised – is coupled with the intangible Earth System, which constitute the functional structure of the planet, and on which no legal division - real or abstract - can be realized. Such a model would allow recognition, at the global scale, of a set of interdependencies and relations similar to those existing among neighbors who inhabit the same materially indivisible building, and who have an equal, vital dependence on the proper functioning of the common functional elements.

In such a planetary condominium, the apparent limitation of sovereign powers presents an opportunity to redefine the meaning and terms of sovereignty, and opens minds to creative and innovative means of problem-solving with the inherent understanding that the overall long-term functionality of the Earth System needs to be safeguarded.

6.2.2. Realizing the Planetary Condominium model

2.1) The Earth System as an autonomous legal object of governance.

When Arvid Pardo formulated the Common Heritage of Mankind (CHM) concept in 1967, he realized that the characteristics, principles and objectives of CHM did not fit within the one-dimensional view of the planet as a sole geographic area. Conscious of this, he sought to avoid the limitations of the territorial approach by proposing an ocean space treaty that "*attempted to show how the common heritage concept could be implemented in the marine environment as a whole"*(1975,67). Intuitively, the rationale of the CHM concept incorporated the idea of interconnectedness and the impossibility for the global commons to be solely confined outside national borders, and managed through siloed governance models.

It is only recently that the understanding and measuring of non-territorial, functional and intangible *"global environment as an integrated whole"* has been created by the Planetary Boundaries (PBs) concept (Steffen et al. 2015; Rockström et al. 2009) .

Based on intrinsic "hard-wired" properties, the PBs define a combination of parameters that together describe the state of the Earth System, thus enabling the understanding of the role of interacting chemical, biological and physical processes in the maintenance of a favourable state for humanity (i.e., the Holocene), as well as the role of humankind in pushing the System out of its stable, desirable state.

Such a definition of the favourable *state* of the Earth System and its qualitative boundaries is what allow us today to identify the object deserving legal protection – i.e., the *Safe Operating Space* – and in making it a new object of law.

The recognition of objects of intangible character are not new to legal sciences: the recognition of intangible cultural heritage by UNESCO, the good will value of companies in commercial law or intellectual property rights, are examples of "values" that, despite being intangible, received legal recognition and a legal regime to regulate their protection and use. An analogy in scale between these intangible objects of law and the intangible Earth System is then crucial to understand and recognize the global and indivisible functionality of the Earth System for our society. By envisioning a Planetary Condominium, with tangible and intangible parts, we are thus defining a global autonomous legal good, one that is complementary and can co-exist with the sovereign powers of States.

The *intangible favorable state of the Earth System* corresponding to the geological epoch of the Holocene has an outstanding value for humankind. It is the meta-condition for all current life on the planet, and therefore should be represented appropriately in law. As such, we present the recognition of the maintenance of a Holocene-like state of the Earth System as a **Common Intangible Natural Heritage of Humankind**. Such a conceptual breakthrough is the essential first step for the organization of the global community that must be followed by the development of a new legal system for our Planetary Condominium.

2.2) Structure, functioning and mandate of the planetary condominium governance model.

To institutionalize this newly defined heritage, the mission of the Planetary Condominium - to maintain the Earth System in a well-functioning state for the benefit of all humanity and the future generations - should be tasked to an independent institution,

acting on behalf of all nations. The activities of such an institution should be limited to the elements that fall under the regime of "common heritage".

Currently, the only relevant institution with global membership and legitimacy to host such a mission is the United Nations (Gautam 2016). In order to act upon the whole Earth System rather than its individual components through multiple UN agencies, and taking into full consideration the known difficulties in amending the UN Charter (Gautam 2016), we propose instead, to revive the UN Trusteeship Council (TC) with a mandate to serve the mission of humanity's Common Heritage.

In the early 1990s, the TC was suspended as it had accomplished its mandate of administering trust-territories. A first proposal for a revival of "UN Trusteeship of the Global Commons", advanced in 1994 by the Commission on Global Governance, highlighted the need for international trusteeship to be exercised over the management of the physical and territorial environment (i.e., the oceans beyond national jurisdiction, outer space, and the related environment and life-support systems). This proposal was rejected leaving the TC a dormant body which today exists solely on paper.

The increased urgency of major global challenges and the realization of the inadequacy of current governance systems indicate it is time to start thinking beyond the paradigm of sovereign nation-states and conventional market mechanisms to broader planetary concerns. Building and expanding on the original idea of the Commission on Global Governance, we thus propose reviving the TC as a trusteeship for the Earth System and the global commons it represents.

A healthy and stable Earth System is the precursor to all the territorial global commons, and a necessity to mitigate all environmental challenges and Global Catastrophic Risks (GCRs). A revived 'Trusteeship Council for the Earth System and the Global Commons" would be the chief forum for dealing with the administration of existing environmental treaties and the management of global biogeophysical cycles; it would define priorities, compensations, incentives and quotas among all users of the Common Heritage.

This will require a permanent capacity for the TC to take decisions, with expeditious decision-making processes involving assessing, monitoring, supervising, allocating, awarding and arbitrating. As such, the new TC should function as a true manager of global biogeophysical cycles with a remit to regulate and sanction, with the goal of assuring stable functionality of the system.

The TC would be supported by a permanent Scientific Commission, to be elected in a TC meeting. Such a committee would guide the work of the TC by continuously monitoring appropriation and preservation of the PBs by country. The composition of the permanent Scientific Commission would be interdisciplinary with experts representing PBs, and additional appointments of Earth Science experts, ecological economists, ecological lawyers, and experts in GCRs and social sciences.

Our proposal is to put GCRs and Earth System management at the same priority level as maintaining peace and security – the founding motives of the UN. GCR management and mitigation are a question of security, and therefore are a strategic area upon which the UN should intervene.

Alongside the support of the permanent Scientific Commission, the TC shall carry out its mission in collaboration with, and under the umbrella of, the UN Security Council (SC) - "in order to ensure prompt and effective action by the United Nations" (Article 24.1). Such cooperation and complementary functional competences between the TC and the SC is already provided for by Article 83.1 of the UN Charter "*All functions of the United Nations relating to strategic areas, including the approval of the terms of the trusteeship agreements and of their alteration or amendment shall be exercised by the Security Council*" and Article 83.3 "*The Security Council shall, subject to the provisions of the trusteeship agreements and without prejudice to security considerations, avail itself of the assistance of the Trusteeship Council to perform those functions of the United Nations under the trusteeship system relating to political, economic, social, and educational matters in the strategic areas*."

In accordance with Article 29, and to complement the role of the TC and the SC, we propose that the Security Council establish a new organ – a Global Catastrophic Risks Staff Committee (GCRSC) – (similar to the already-existing Military Staff Committee) – to advise and assist the SC on all questions related to the implementation of concrete actions aimed at avoiding or mitigating Global Catastrophic Risks, and special disasters that could cause serious impacts in the state of the Earth System or could impact at least 10% of world populations.

The GCR Staff Committee shall consist of 11 members chosen between the TC and SC. It is suggested that the GCRSC composition include 2 representatives from TC , 3 members from the permanent Scientific Commission and the SC to be represented by 6 Members to ensure equal representation of world geographies. The GCR Staff

Committee, with the authorization of the SC and after consultation with appropriate regional agencies, may establish regional sub-committees.

The legal recognition, through the mechanism of a convention, to protect the favorable state of the Earth System as a Common Heritage of Mankind, calls for the development of a system for its legal interpretation and application. The cornerstone of such a convention would be fair and ethical representation and maintenance of the favorable state of the Earth System. Such a mechanism, that finds precedence in the United Nations Convention on the Law of the Seas, would allow for the arbitration of disputed decisions through an autonomous and specialized international Tribunal.

2.3) Coordination platform for the equitable management of the intangible global commons

The most effective means to organize global relationships in the context of an international system, where everyone has the power to influence and impact all others, is through a system that aggregates and gives visibility to the different impacts produced by everyone in all the different scales. Rephrasing Ostrom's words [8], there is a need to clearly define who the users of CPRs are, and who have the right to withdraw resource units from such CPRs.

The Common Intangible Heritage will be the platform where the intangible positive and negative global "externalities" are captured, internalized, accounted for, and where the impacts of each individual, family, business, city, and nation State become visible. The proposed global governance mechanism of this intangible heritage will give visibility to all individual or collective actions and their intangible outcomes, whether positive or negative; as such each effort will not disappear into a global legal vacuum, thus empowering each individual to be a steward of the Planet.

This will incentivize decentralized decision-making, where tasks are to be allocated at the lowest possible level as part of a larger nested polycentric governance system, while at the same time, providing feedback on the performance.

Only by clearly accounting for the contributions of each entity will it be possible to create a system of compensation, where equity and the social norm of mutual confidence could flourish. Further, by addressing the human use and management of the Earth System, we firmly believe that the proposed governance model could reduce the environmental-related threats to political instability.

2.4) ESAF: the necessary accounting framework for enabling the implementation of the Planetary Condominium

The mechanism for translating the Planetary Condominium's legal framework into action for implementation, requires the construction of a transdisciplinary accounting system able to track and manage nation States' use of the intangible Earth System. To this end, we propose the introduction of the "Earth System Accounting Framework" (ESAF). This requires transposing the PBs to a set of scalable indicators, applicable at any scale of human activity to assign Planetary Quotas (PQs).

The PBs framework summarises the complex interactions of the Earth System functioning in an intelligible way, and highlights the main trends in its state. However, the main limitation of PBs is that the trespassing of global thresholds cannot be scaled down to the sub-global level (e.g., nation States) nor compared to the specific human activities that are causing it. For example, the PB threshold for climate change is the concentration of CO_2 in the atmosphere, with clear difficulties in then assigning acceptable CO_2 concentrations to each nation State.

Once fully developed, the ESAF accounting system would be able to: 1) quantify the extent to which socio-economic activities within nation States degrade or enhances the "intangible favorable space" of the Earth System from a biophysical viewpoint and 2) design an economic compensation scheme for the maintenance of such a favorable Earth System state.

2.4.1) The Planetary Quotas

There are 8 Planetary Quotas: carbon, non-CO_2 greenhouse gases (GHGs), land, nitrogen, phosphorus, water, aerosols, and ozone depleting substances (ODPs). The complexity of the Earth System and interrelatedness of the PBs is such that there is no direct one-to-one conversion from the PBs to PQs. However, together, the PQs represent the same safe-operating-space as the PBs and can be divided or allocated to any scale from individual and community, to city, regional or national scales (Meyer & Newman, upcoming 2018).

The basis of the ESAF is that every person has an equal right to our Common Heritage and thus a right to benefit from an equal share of the life-supporting function of the Earth System. Each nation State will thus be allocated one quota/threshold for each of the 8 PQ, based on an equal per capita share. A consumption based environmental accounting procedure composed of 8 indicators – similar in their rationale to Footprint-type of indicators (Galli 2015) – will then be used to compare each nation State's use of the global commons against the calculated Quotas. The result will be a balance sheet of Earth System credits and debits for each of the 8 PQs, indicating to what extent each nation State deviates from the quota. For a climatic change PQ, for instance, a biophysical threshold (in terms of tonnes of CO_2 emitted per person) could be set, which should not be exceeded to maintain warming below 1.5 degrees. A carbon-footprint-type indicator would then be used to calculate the actual amount of CO_2 released into the atmosphere by the consumption activities of each nation State's residents. This would then allow the calculation of the deviation (± xx%) of the footprint value from the allocated Quota. A similar approach could be deployed for each of the other PQs.

Overuse or underuse of the Earth System functionalities – in other words trespassing or staying within each of the Quotas – will then correspond to a monetary fee that should be either paid for or received by countries, depending on whether they contribute to the maintenance of or drive perturbations to the Holocene-like state of the Earth System.

As explained in section 2.4.2, the monetary valuation of such overuse or underuse will be estimated by the permanent Scientific Commission of the Trusteeship Council based on the true ecological costs of overshoot per unit of each environmental currency (eg. $/kgCO2) and the information provided by Earth System sicentists, taking into account the scarcity and availability of each of the core drivers of PBs. Earth System credits will likewise be compensated using these same rates, thus making the value of the Earth System an integral component of our global economy.

It should finally be noted that, as the Earth System does not trade one environmental impact for another – for example, no amount of safeguarded water would compensate for excessive GHGs emission in preventing global warming – the ESAF does not envision trade-offs among Quotas. Rather it is designed to drive human behaviour such that none of the Quotas are exceeded, and therefore the Planetary Boundaries are adhered to.

We note that there is much controversy over historic contributions to global warming and substantial literature on the ethics of different allocation procedures. However, the ESAF differs from previous accounting systems in two fundamental ways. Firstly, the

PQs go well beyond the only GHGs emission, and the historic impacts of, for example, land use, or phosphorous consumption, which have very different global distributions. Secondly, its accounting principle is consumption-based rather than production-based. Conventional carbon accounting, for instance, assign responsibilities to the producers, and poorer nations, which often devote their production activities to export, thus assigning relatively high impacts on the Earth Systems to them, compared to their quality of life. In the consumption-based accounting system we propose, the embodied impacts of goods and services will be carried over and associated with those nation States consuming them.

2.4.2) Economic compensation scheme

In her book, Ostrom (1990) calls for the need of congruence between appropriation and provision rules, indicating that any successful management of the commons requires not only rules on the commons' use or appropriation, but also a permanent system of maintenance and restoration to ensure their long-term functionality.

As such, planetary stewardship implies not only the control and penalization of negative impacts on the Earth System (e.g., the perturbation of bio-geophysical cycles), but also the provision to acknowledge, reward and incentivize the maintenance or improvement of the functional infrastructures that generate Earth System services.

In the current economic system, economic gains are realized – directly or indirectly – through degradation and/or destruction, that is, in the consumption of natural capital. For instance, the value of forests, vital for the maintenance of the favourable state of the Earth System for our lives and for future generations, only become visible in the financial and economic transactions of society when these forests are destroyed and turned into timber. As Carl Folke (2011:8) states: "A significant part of this challenge is to make the work of the biosphere visible in society, in human actions and in financial and economic transactions".

When the production of positive processes for maintaining the favourable state is synonymous with economic loss, there can be no change in our behaviour to reduce the negative impacts nor can there be any investment in realizing benefits to the common Heritage. However, if we recognize the favourable state of the Holocene as a legal autonomous good, we can capture in this intangible common heritage not only the

damages, but also the benefits that contribute to the maintenance of this favourable state. By recognizing and capturing the most vital Earth System services, it becomes possible to frame the economic processes in the context of global chemical, biological and physical processes that support life and human activities, thus modifying economics to become consistent with Earth System dynamics.

The possibility of using this intangible common heritage for making the work of the Earth System visible in society, in human actions and in financial and economic transactions implies a deep conceptual and structural shift in our economy, transforming the current paradigm of individual benefits and collective costs to one in which individual benefits are also gained through collective benefits. In a Planetary Condominium set-up, in which Common Heritage and State sovereignty co-exist, the pursuit of individual interests would become in tune with the interests of all humankind.

For this to be possible, our proposal is to use the accounting system described above in section 2.4.1 as the biophysical basis for an economic compensation scheme in which the overuse or underuse of the Earth System will correspond to an annual fee to be either paid for or received by nation States, depending on whether they contribute to the maintenance or the perturbation of the Holocene-like state of the Earth System.

Managing the flow of funds - assigning penalty payments and allocating funds to countries with positive Earth System balances - would be a key mandate of the TC carried out annually. We envision a small proportion of the incoming funds to be used to cover administrative expenses of the TC, with the majority of the funds to be used in tackling priority emergencies, paying back historical inequalities (in reimbursing those negatively affected by the abuse and/or misuse of the commons) and to cover payments in the compensation scheme to maintain (or enhance) key ecosystems and biomes – located under or outside the jurisdiction of one or more States – whose services are necessary to ensure the functionality of the Holocene-like state of the Earth System, and to invest in transitioning to a sustainable future for all.

With such a system in place, each nation State shall be given full capacity to define its own strategy for conserving or restoring its ecosystems, such as investing in technology efficiency or other alternatives, or changing or reducing its use of the Earth System, with the mandatory goal of achieving its own best balance in relation to the Common Heritage.

The inclusion of the positive environmental impacts in an accounting system could trigger a positive competition for restoring the state of the Earth System. This would encourage a major paradigm shift, from an economy rewarding natural resources'

extraction to an economy which fosters innovation, and where preservation and production of natural resources and well-functioning ecosystems are economically rewarded

6.2.3. Final Remarks:

Although Earth has a specific physical spatial attribute of 510,000 million hectares, we are all globally connected through impacts that each of us produce on the intangible biogeophysical functioning of the Earth System. This non-spatial interconnected Global Community, has no territory in which it can base a legal existence or a cohesive representation of its own interests. But attempts have been made to meet this challenge, and valuable and inspiring examples do exist such as,

- The Antarctica Treaty System of 1959, that is considered by some a *de facto* condominium (Glennon 1991) since it is not a sovereign territory (although various nations claim parts of its territory as their own) and provides voting authority for 28 nations to jointly govern the area. In all, 50 countries are part of the "condominium" although some consider it a "quasi-condominium" (Hemmings 2014).
- Article 136º of the Montego Bay Convention (UNCLOS) states, "The Area (Sea-bed) and its resources are the common heritage of mankind". This Convention adopted a concept of humanity that transcends the notion of State, transferring its point of reference to the peoples, regardless of their legal subordination to a State. Humanity appears as a transcendent reality to the states and to the present generations.

Similar to the findings of Nicholas Stern (2007) for the case of global warming, we believe the cost of maintaining the Holocene-like state of the Earth System – especially if shared by the global community – is likely to be lower than the future cost of today's inaction. We believe that the Planetary Condominium model is an opportunity for nation States to realise and successfully manage its relationship and use of the Earth System.

The relationship that the Planetary Condominium model effectively operationalizes is the environment (or rather a well-functioning, favorable state of the Earth System) that

supports society, which then builds the economy. Further, this model details spatial, functional, as well as temporal dimensions to addressing humanity's defining challenge, which is to maintain a favourable state of the Earth System for the continued success of humankind on this Planet.

Besides the legal conceptual evolution, another uniqueness of the Planetary Condominium model is the novel accounting system combined with the renewal of existing global management structures that lead to a very different set of motivations and barriers to sub-national and State involvement. Consumption based accounting in environmental currencies beyond carbon shifts the spread of environmental burdens and opportunites. Not every environmental currency carries the historic components inherent to carbon accounting. Thus, the proposed mechanism to operationalize the Planetary Condominium does not carry the same ethical and political barriers that have been present in past global action on climate change.

In conclusion, the model of activties and operations proposed by this Initiative constitutes an integrated evolution of experiences in the international management of territories and their extention to the management of a "virtual territory" whose existance, despite being intangible, cannot be overlooked.

The approach of the proposed Initiative is more extensive and representative in participation and remit. It integrates and builds on several mechanisms that already exist, to make tangible, the intangible concept of the Common Heritage of Mankind. This Initiative puts the Earth System and its stability in the spotlight, attempting to empower it through a legal mandate, to ascertain the continued existance and prosperity of the human civilization. It puts human relationship to the Earth System on centre stage to devise a mechanism of management and maintenance. In being able to do so, the Initiative hopes to opens new avenues and models of solutions to tackle the urgent and trans-generational global challenges today's world presents.

6.3. ASSESSMENT CRITERIA

6.3.1. Core Values

The mission of the proposed initiative is to safeguard the favorable state of the Earth System as a common heritage of humankind across all sectors and societies, irrespective of geo-political jurisdictions. Such a mission envisions,

- ⇨ the creation of a world in which all countries work together to preserve our planet's Safe Operating Space for humans and all living species.
- ⇨ For societies to be driven by a new economic model that prioritize the preservation of nature, not its depletion.
- ⇨ the building of an inherent sense of respect and belonging to our Common Home – as citizens of planet Earth, enriched by our individual cultural diversities.

To this end our core values are rooted to ensure scientific rigor and evidence based activity and response; assign a universally recognized legal existence to the Safe Operating Space - the common intangible heritage for all humankind; practice socio-cultural, economic and political diplomacy; and, create a platform that allows global representation and fosters universal participation.

This would define the construction of an operational mechanism for the monitoring and protection of the Safe Operating Space, that is resilient, allows socio-economic equity, functions through active dialogues and is transparent, reliable and accountable.

6.3.2. Decision-making Capacity

In line with the core values, the decision making process will be based on scientific evidence, with legislative clarity and expedited in a transparent, reliable and accountable manner.

Operationally, decision-making involving assessing, monitoring, supervising, allocating, awarding and arbitrating is proposed to be undertaken by the revived UN

Trusteeship Council for the Earth System and the Global Commons, with a mandate to regulate and sanction, with the goal of assuring functionality of the governance model.

From the perspective of ensuring robust scientific and technical monitoring and assessments, the Council's activity and decision are to be supported by the Permanent Scientific Commission comprised of Planetary Boundaries scientists, Earth System scientists who study the whole system, ecological economists, ecological lawyers, experts in Global Catastrophic Risk and social scientists. The main role of the Commission will be to provide an overview of global effects. This includes establishing of the connection between scientific information and assigned monetary values, assessments on cultural acceptance, community rights and responsibilities, among other decision-making parameters requiring trans-disciplinary input. The trans-disciplinary composition of the Permanent Scientific Commission will be mandated to contextualize and frame economic processes in the context of global chemical, biological and physical processes that support life and human activities, integrating Earth System dynamics and economics - work that no market-mechanism is currently able to do.

The Earth System Accounting Framework (ESAF) and the Planetary Quotas (PQ), developed by this scientific commission would aim to offer rigorous administrative accountability and transparency in support of the operational regulation and decision-making processes. Complementary functional competencies and relationship between the Trusteeship Council and the UN Security Council, stated through Articles 24.1, 83.1 and 83.3 of the UN Charter, lends an important degree of administrative surveillance, and therefore further reliability and accountability of decisions and actions.

Further, to complement the roles of the Trusteeship Council and the Permanent Scientific Commission, we propose that the Security Council establish a new organ – a Global Catastrophic Risks Staff Committee (GCRSC) – (similar to the already-existing Military Staff Committee) – to advise and assist the Security Council on all situations related to the implementation of concrete actions aimed at avoiding or mitigating Global Catastrophic Risks and other disasters that could cause serious impacts to the state of the Earth System or could impact at least 10% of world populations. This would further bolster prompt action and implementation related decision-making in addressing these vital cases.

6.3.3. Effectiveness

Factoring in the sensitivity of the decision-making process and conscious of the fact that only structural shifts will lead to systemic effects, this initiative proposes an incentives-based system for the production of global public goods, rather than being an exclusive coercive legal system of injunctions, whose legitimacy would always be questionable and that no sovereign State will accept.

In this sense, the effectiveness of the proposed initiative draws from:

- ⇨ the communication of its scientific studies and socio-economic management structure that will demonstrate and actively work towards driving the perception that prioritizing an ongoing, resilient and well-functioning Earth System does not result in economic loss.
- ⇨ The fact that even though PQs cannot be translated directly back to the PBs (as they are also global limits in different indicators that allow the safe-operating-space to be divided and operationalized), the PB method would still be used to assess the global status of Earth System functioning relative to a Holocene-like state. The point here is that the true ecological costs of overshoot per unit of each environmental currency (e.g. $/kgCO2) can be determined. In this way, if everyone participated, the system would generate enough money to cover the costs of mitigation/adaptation – and that it would be spent for this purpose. This would remove one of the barriers that has prevented some from signing global treaties for limiting carbon emissions – i.e. the idea that the money contributed may be "misused".
- ⇨ the economic element of the ESAF / Planetary Condominium model, that proposes a financing system that will not only favor investments in natural capital and the preservation of critical Earth System functions, but also invest to fight extreme poverty by making sure that individual basic needs are met. The accounting system will address inequality between poor and rich, north and south, as well as rural and urban people. This could also contribute towards dealing with the root causes of politically-motivated unrest and in extreme cases, violence.

- its programmatic approach, where we choose to organize management of the initiative under the auspices of the United Nations as the sole, truly global and trans-disciplinary institution relevant and respected by all its member nations. We propose to channel the work of the initiative through the close and complementary relations between the TC and Security Council (SC) already foreseen in UN Charter, and propose the creation of a Global Catastrophic Risks Staff Committee by the SC to ensure the possibility of prompt and effective action by the United Nations. Thereby, we introduce the Earth System management and GCRs at the same level of importance as the maintenance of peace and security, which are the founding motives of the UN.

Further, providing visibility to all individual or collective intangible outcomes for each action, (positive or negative) would empower each individual to become a steward of the Planet. This will incentivize decentralized decision-making where tasks are to be allocated at the lowest possible level as part of a larger nested polycentric governance system, while at the same time, providing feedback on the efficiency and efficacy of its performance.

6.3.4. Resources and Financing

Through its work over the past 10 years the initiative already supports a robust and growing team of

- Scientific and social science expertise
- Advisory board of the initiative in its current state
- Researchers and academic personnel
- Material resource

In its current operations of building the core features of the initiative, grants and funds have been sourced from Portuguese Governmental authorities and through commercial consulting partnership contracts.

On the international scale, operations would be supported through the inflow of penalty costs and environmental levies that will be charged, once the full penalty, compensation and stewardship schemes are in place, implemented and regulated. This is to be executed under the following mechanism:

- ⇨ Comparing each nation State's use of the Common Heritage against the calculated Quotas. The result will be a balance sheet of Earth System credits and debits for each of the 8 PQs, indicating to what extent each nation State deviates from its quota. Overuse or underuse of the Earth System functionalities – in other words trespassing or staying within each of the Quotas – will then correspond to a monetary fee that should be either paid for or received by countries, depending on whether they contribute to the maintenance or perturbation of the Holocene-like state of the Earth System.
- ⇨ There are other possibilities for financing the Planetary Condominium, such as the charging of a modest rental or transaction fees that could mobilize significant funds. These could include charges on: military spending and arms exports, foreign exchange transactions, international trade, airline tickets, maritime freight, ocean fishing, sea-bed mining, satellite parking spaces, use of electromagnetic spectrum and the internet.
- ⇨ Knowing that humans have already altered the Holocene-like state of the Earth System, entered the Anthropocene, transgressed 4 of the 9 PBs, and overshot all footprint metrics related to our planetary resources and sinks, it is clear that the sum shall begin with costing penalties and compensations. In an ideal world, the success of our initiative will be measured by the reduction of penalties and compensations and a rise in the stewardship awards, complemented by observations and models suggesting restored Earth System stability.

The basis of the ESAF is that every person has an equal right to our Common Heritage and thus a right to benefit from an equal share of the life-supporting function of the Earth System. Through the Economic compensation scheme, fairness and equity could be achieved in balancing the responsibility between the biggest users of the Earth System and those that provide common benefits.

6.3.5.Trust and Insight

The functions that enhance trust in the proposed initiative and its mode of operations are:

- ⇨ the inability of the multiple siloed mechanisms that attempt to answer globally pervasive challenges
- ⇨ the fact that the initiative will provide a legal mandate to the representation of the Earth System in its favorable state in order to represent the interest of all humankind in the present and future
- ⇨ the multiple-levels of accountability – the science, the economics, law and governance structure.
- ⇨ Operating through the universally recognized body for peace and security- the United Nations.
- ⇨ Open access to the science, the practice of the legal framework and all the information that constitutes the basis of all decisions in this initiative and its governance

Most importantly, only by clearly accounting for the contributions of each entity will it be possible to create a system of compensation, where equity and the social norm of mutual confidence could flourish.

The initiative highlights the valuable insight, based on observations in science and in the natural disasters in the world we see today, that intangible systems are equally important and worth recognizing and protecting for humankind to thrive.

Bringing the basis of human survival and enterprise – the favorable, stable Earth System- to the forefront is one of the most profound insights of this initiative. This insight has no economic worth of its own but when it becomes the core concern of socio-economic decisions, it would play a pivotal role in resolving and finding solutions to the most complex challenges humankind is faced with today and will face in the future.

The Law of the High Seas and the Sea Bed conventions that exist to protect their respective domains have proven that it is possible to build on the effectiveness that these

frameworks of governance have shown to expand the mandate of the Earth System as a whole.

6.3.6. Flexibility

The feedback mechanisms of the initiative's model, just as the dynamic nature of the Earth System itself, creates flexibility in incorporating new findings and perspectives into the decision-making system. The initiative has developed its operational model based on the three principles that Dietz et al. [22] listed in 2003 stated as being particularly relevant for problems at larger scales:

- ⇨ well-structured dialog involving scientists, resource users and interested public;
- ⇨ institutional arrangements must be complex, redundant and nested in many layers;
- ⇨ governance should imply mixtures of institutional types.

6.3.7. Protection against the abuse of power

The initiative maintains the stability of the favorable Earth System as its core objective. The construction of the regulatory mechanisms and the governance systems are hence focused on this core objective and protected as highlighted below:

- ⇨ Just as the Earth System does not trade one environmental impact for another the ESAF does not allow trade-offs among Quotas. Rather it is designed to drive human behavior such that none of the Quotas are exceeded, and therefore the Planetary Boundaries are respected.
- ⇨ The initiative proposes to be embedded within the UN, as the only existing institution with the most universal membership and legitimacy, with a General Assembly where 193 members-States have a seat, with a majority of democratic procedures in almost all of its organs, with an internal

separation of powers and competences in different organs, of which one is the International Court of Justice.

6.3.8. Accountability

The Common Intangible Heritage will be the platform where the intangible positive and negative global "externalities" are captured, internalized, accounted for, and where the impacts of each individual, family, business, city, and nation State become visible. The initiative has installed an accounting system for its scientific work on Earth System protection, its framework of economic activity within the initiative and the governance structure as highlighted below:

- ⇨ The Earth System does not trade one environmental impact for another – for example, no amount of safeguarded water would compensate for excessive GHGs emission in preventing global warming – the ESAF will not allow trade-offs among Quotas.
- ⇨ The ESAF system is developed to compare each nation State's use of the global commons against the calculated Quotas. The result will be a balance sheet of Earth System credits and debits for each of the 8 PQs, indicating to what extent each nation State deviate from the quota.
- ⇨ The monetary valuation of such overuse or underuse will be estimated by the permanent Scientific Commission of the Trusteeship Council based on the natural capital valuation literature and the information provided by Earth System scientists, taking into account the scarcity and availability of each of the core drivers of PBs. Earth System credits will likewise be compensated using these same rates, thus making the valuation of the Earth System a transparent process.
- ⇨ Open access to the databases, scientific material and decision-making criteria allow further accountability of the processes.
- ⇨ The multi-layered organization, embedded in the most unbiased of global organizations- the United Nations - and the trans-disciplinary team that

executes the governance system of the initiative is able to self-check and regulate the decision-making process to be relevant, impartial, representative, fair as well as contestable.

- ⇨ Just as the international Courts have an international tribunal for the law of the Sea, the initiative shall work towards the development of an Earth System Convention that is protected by a similar jurisdictional system.

Chapter 7

SOS TREATY – Safe Operating Space Treaty

Draft on the
COVENANT ON THE MANAGEMENT OF EARTH SYSTEM USE.
"SAFE OPERATING SPACE OF HUMANKIND"
AS A NATURAL INTANGIBLE COMMON HERITAGE OF HUMANKIND

7.1. PREAMBLE

Considering that:

- All countries are exposed to environmental impacts, positive and/or negative, from other countries. Given that knowledge of this reality is still recent and the Earth System continues to be used in a non-regulated manner, humanity has now reached a point where it is characterized its own life-support system.

- The main structural motive at the origin of this unregulated use is the fact that the Earth System does not exist from a legal perspective, and is therefore being used as a no-man's land (*res nullius)*.

- The global commons were always (and continue to be) understood as the mere remaining geographical spaces of political division between states. The ecological goods that exist in and outside all sovereignties simultaneously currently find no legal autonomous existence within the current legal framework. Humanity, as a whole, both in the present and the future, corresponds in the same way to this juridical inexistence.

- The global, diffuse and intangible dimension of a vital good such as a stable climate, effects from the damage to which are sustained over several generations, transform this traditional approach into an ecological nonsense. Today's doctrine recognizes that international law contains a structural theoretical error in its approach towards global ecological goods and their intergenerational dimension.

- Recent developments in Earth System science, which define and describe the *Earth System* as a whole, provide us with insights into the nature and limits of the Holocene epoch (the last 11,700 years) – the only state of the Earth System that we know with certainty can support advanced human civilizations.

- It is now possible to understand the chemical, biological and physical processes of the Earth System that are conducive to maintaining a favourable state for humanity (i.e., the Holocene) and those that act to push the Earth System out of a stable, desirable state.

- A tipping point is when a system fundamentally changes structure and function, tips over and settles into a new stable state. And the prerequisite to do so is that a feedback mechanism, which keeps the system tightly in one state, changes direction.

- This favourable state, which arose in an evolutionary fashion throughout Earth's history, is an "intangible natural limited resource" on Earth. In essence, it is the integration of the geophysical properties of the planet with the living biosphere that forms the intangible Earth System, a single global system incompatible with any legal abstraction of division. With the shift of the biogeophysical structure, the system changes fundamentally from one stable and favourable state to another stable state.

- With the growing understanding of the Earth System and the recent possibility of measuring its state through the definition of planetary boundaries – (Rockström et al. 2009; Steffen et al. 2015) – we now have a scientific basis upon which to define the *Safe Operating Space* of the Earth System.

- With the ability to quantify and define the desirable state of the Earth System, we've made a giant step in order to solve the legal vacuum created by the indeterminate and vague concepts that have characterized national or international legal texts over the last decades. Expressions such as the *common concern of humankind, the common interest of humankind, the life-support system, intergenerational solidarity, ecological integrity and sustainability* now have a set of indicators and numbers that encircle and delimitate what is global sustainability.

- This new knowledge can be instrumental in the architecture of new solutions that allow us to overcome the existing dysfunctionality between ecological reality and the current legal constructions.

- Throughout history, newly discovered spaces became objects of legal definition. The knowledge of this intangible and non-territorial *Safe Operating Space* of the Earth System obliges our social institutions to respond to the most recent scientific evolutions and build new representations capable of going beyond the reductionist legal, physical or biological approach that represents nature merely as a geographically delimited space or as a collection of biological species that can benefit from legal protection.

- To achieve this fundamental shift, we need to be capable of representing the Earth System as a whole in international law. To do this in a legal sense, we need to

identify the legal status of the Earth System. "*How can a good that belongs to no one be subject to a legal regime?* (Kiss 1982:122)?

- In this sense, the first step to structurally organizing this interdependence is to achieve a clear delimitation of the common good/resource to be protected (both inside and outside of all sovereignty) and upon which we all depend. Only then we have the structural conditions to be possible organize its use in a sustainable way.

- To make this evolution real, every benefit and/or damage made to the Earth System can no longer disappear into a "legal black hole". Economics calls those benefits and/or damages "positive and negative externalities" but they cannot be "external" to our societies.

- If we are able to identify and measure the core global drivers that define the state of the Earth System, we have the necessary conditions to start to manage its use. Once it is measured, it can be managed and operationalized.

- In the theory of international public domain, it is possible to attribute certain goods to interests of the community without changing the rules of jurisdiction, that is, without subtracting these goods from the sovereignty of territorial states or from the property of other entities.

- Today's institutional architecture does not operate as a governance *system* capable of addressing global challenges and rising above the fragmentation, segmentation and incoherence that result in today's ineffective institutions.

- Before undertaking a practical reform, we need a new approach able to close the gap between the theory that underlies the organization of international institutions and the reality of Earth System dynamics.

- If we are able to create a new legal fiction capable of addressing the intangible quality and the non-territorial dimension of the Earth System state, which has a dialectical relationship with tangible territories of states but is not confined to any state (and therefore cannot be considered a subtraction to a sovereign power of a state), we can create a legal object distinguishable from every sovereignty.

- The actual legal inexistence leads to the absence of a scheme of contributions or responsibilities to ensure both the maintenance and necessary improvements for a well-functioning Earth System, and leads to the lack of an administrator (or an institution with similar functions) in charge of ensuring its ongoing maintenance in a sustainable way.

- A legal model for the Anthropocene requires a regulation responsible for ensuring the protection and promotion of common interests through the construction of a new way that represents the interests of all humankind, both in the present and the future.

Mindful of the will of the peoples, set out solemnly in the Charter of the United Nations, to safeguard the values and principles enshrined in the Universal Declaration of Human Rights and all other relevant instruments of international law,

Concerned by the fate of future generations in the face of the vital challenges of this century,

Conscious that, at this point in history, the very existence of humankind and its environment are threatened,

Recalling the UNESCO Declaration on the Responsibilities of the Present Generations towards Future Generations from 21 October to 12 November 1997,

Bearing in mind that the fate of future generations depends to a great extent on decisions and actions taken today, and that present-day problems, including poverty, technological and material underdevelopment, unemployment, exclusion, discrimination and threats to the environment must be solved in the interests of both present and future generations,

Convinced that there is a moral obligation to formulate behavioural guidelines for the present generations within a broad, future-oriented perspective,

TAKING INTO ACCOUNT the need to define and develop the provisions of international instruments in relation to the Earth System use… **have agreed on the following:**

GENERAL DISPOSITIONS

7.2. PART 1 – OBJECTIVE

ARTICLE 1

Objective

This Draft Covenant provides a legal framework with the aim of transforming our common inhabitation of the planet from a system of exploitation to a system of stewardship of the Earth System through a process of self-organization to manage its use.

7.3. PART 2 – FUNDAMENTAL PRINCIPLES

Conscious that the global and deeply interconnected functioning of the Earth System requires new organizational solutions, all parties shall cooperate in a global partnership, looking for new pathways to achieve the objective of this covenant by the following fundamental principles:

ARTICLE 2

Earth System

The Earth System consists of the interacting physical, chemical and biological processes that cycle materials and energy throughout the system at the planetary level. In essence, it is the integration of the geophysical properties of the planet with the living biosphere that forms the intangible Earth System, a single global system incapable of any legal abstraction of division. A key process of the Earth System is self-regulation, which consists of feedback loops formed by component parts of the system (both inside and outside of all sovereignties), which work synergistically to keep the system within well-defined states.
Humans and our activities are an integral part of the Earth System.

ARTICLE 3

The Planet and the Earth System

Throughout the history of planet Earth, on a geological timescale, the Earth System has always existed in a process of permanent transformation. Recent scientific developments defined and described the *Earth System* as a whole, and provided a well-defined biogeophysical structure of the Holocene epoch, the only state of the Earth System that we know for certain can support advanced human civilizations.
The recognition that the planet Earth and the Earth System's state are two distinct concepts is a structural prerequisite to enable a global legal approach.

ARTICLE 4

The Qualitative State of the Earth System

The Earth System is a ***single*** and ***complex system*** that exists within the boundaries of well-defined states. It's now possible to understand the chemical, biological and physical

processes of the Earth System that are conducive to maintaining a favourable state for humanity (i.e., the Holocene) and those that act to push the Earth System out of a stable, desirable state.

ARTICLE 5

Planetary Boundaries

The Planetary Boundaries (PB) framework provides a scientific basis upon which it is possible to define the features of the *Safe Operating Zone for humankind,* strongly oriented towards maintaining a relatively stable state of the Earth System, one that is very similar to that of the past 12,000 years (Holocene). From a human perspective, PBs are biogeophysical limits that define the state of the Earth System, that exist through the identification of control variables and tipping points from which irreversible abrupt global changes may occur.

ARTICLE 6

A Limited Resource

The *favourable state of the Earth System* arose in an evolutionary process involving the interactions between the living biosphere as well as the geophysical part. Given that there are human activities that cause chemical, biological and physical alterations that are conducive to pushing the Earth System out of this desirable state, we can consider that this "favourable state" as a vital good exhaustible through its use. In this sense it is "an intangible natural limited resource" on Earth.

ARTICLE 7

The Source/Resource Relation

From a historical perspective, the *favourable state of the Earth System* is the result of interactions between the living biosphere and the geophysical properties, that is, in this sense the ecological infrastructures of biosphere are *sources* that contributed and still contribute to maintain this resource.

ARTICLE 8

Remaining Ecological Space on Earth

From the moment we are aware that this favourable biogeophysical structure of the Earth System is exhaustible, internal relations are equally reconfigured among all users of that

resource. We need rules in order to organize the relations established around the use of the remaining ecological space for human development, which, by being exhaustible, cannot be used in a free-access regime.

ARTICLE 9

Legal Indivisibility

The Earth System as a single and integrated system cannot be included within any already existing legal convention because it is impossible to divide it conceptually, materially, or through any legal abstraction. Therefore it must be considered a common resource.

ARTICLE 10

A Common Intangible Space

Once the use of this limited vital good is not exclusive to any "user" and no "user" can deny access to any other, in global terms we are facing a situation where all people are exposed to the acts of others, creating an interdependence of benefits and harms shared on a global scale.
In this sense its use requires organization amongst users that defines privileges and responsibilities.

ARTICLE 11

A Primordial Resource

The exceptional stable conditions of the Holocene period, unique in the history of the Earth, are a gift that nature has produced for the use of all humanity, today and tomorrow. It's something that due to its indispensable value to life, belongs to all members of the whole human race and represents more than the sum of individual interests of states. It is a supreme value and primordial resource.

ARTICLE 12

The Patrimonial Dimension

The supreme vital value for humanity, the principle of intergenerational equity and the existence of the 'right' of future generations to receive and enjoy an ecological space that supports their survival confers a patrimonial dimension to the Earth System state within the limits of a Safe Operation Space, since the transmission of a value is the main purpose of the concept of heritage.

ARTICLE 13

Common Home of Humanity

A planet in an undesirable state, which is not able to provide for human ecological needs, will not serve as our common home. In this sense, the common home of humanity, rather than the tangible geographic area of 510 million Km^2 of the planet, is an intangible well-defined state of the Earth System, the "Safe Operating Space" (i.e., a Holocene-like state of the Earth System).

ARTICLE 14

Intangible Space of Interconnection and Innovation

The evolution of the international community added to recent scientific developments on Earth Sciences and the need to address a growing interconnection on global governance justify the expansion of the restricted legal contours of the common heritage of humankind or the World Heritage to new situations where the survival of the human species and life on the planet are at stake.

a) The doctrine considered the common heritage of mankind regime flexible enough to adapt to the emerging challenges the discovery of new resources and values, such as scientific research;
b) It is of notable interest to understand that all the substitutes and derived concepts gravitating around the common heritage of mankind seek to plant a seed for the development of a normative framework as to offer alternatives to govern the global common goods, and not only the areas and resources beyond jurisdictions;
c) World Heritage has already done the course from Material Cultural Heritage to Intangible Cultural Heritage. It seems that this same course can now be reproduced in relation to Natural Heritage;
d) The protection of the Earth System as a World Heritage complies with the functions of UNESCO as a "laboratory of ideas, standard-setter, clearing house, capacity-builder in Member States in UNESCO's fields of competence, and catalyst for international cooperation".

7.4. PART 3 - PRINCIPLES GOVERNING THE INTANGIBLE NATURAL SPACE

ARTICLE 15

Common Heritage of Humankind and World Heritage Evolution

The Earth System within the limits of a Holocene-like state is a vital primordial resource that belongs to all humanity, present and future. By this fact it exists simultaneously inside and outside all sovereignties, and demands one theoretical evolution on the Common Heritage of Humankind and World Heritage concepts, which finds its expression in the provisions of this Treaty.

ARTICLE 16

Safe Operating Space for Humankind

The human way to represent this primordial resource is throughout a set of indicators within the larger system that regulates the stability of the Earth System. These quantitative interconnected boundary levels create the *safe operating space for humankind*, which allow for the delimitation and measurement of a non-territorial common heritage of all humankind. These indicators should also function as a standard reference to guide the future management of the Earth System use.

ARTICLE 17

Just and Fair Operating Space for Humankind

Planetary boundaries are not only a safe space in biophysical terms but could also be used to achieve equity, fairness, and a just distribution of the remaining ecological space on Earth.

ARTICLE 18

Governance System

The planetary boundaries are a truly integrated analysis where all boundaries are interconnected, where a critical transition of one boundary could have feedback

consequences on the entire system. Therefore, this safe space represents more than the sum of the different indicators, and demands governance based on a systemic approach.

ARTICLE 19

Equity

State parties have the right to use the Earth System without discrimination of any kind on the basis of equality, equity and in accordance with international law and the terms of this Treaty.

ARTICLE 20

Accountancy

The common heritage will be this intangible space where accountability should be carried out by an international institution (UN) with coordinating functions, that is, if we have a system of compensation between the different performances of each state on the Earth System state, each state will try to have the best balance (difference between positive and negative inputs), mainly through self-regulation.

ARTICLE 21

Common Standard Pattern

For collective action to become possible, some structural conditions are required. One of them is the ability to measure and compare each action in regard to the maintenance of the favourable state of the Earth System. If equality consists of treating equally what is equal and inequality what is unequal, knowing what is equal and what is unequal presupposes a fixed point, a standard pattern that only law can offer.

ARTICLE 22

International Institutionalization

Taking into account the characteristic of non-exclusion of access to this common vital resource on a global scale, the application of fundamental principles of the common heritage of humankind to a well-defined state of the Earth System implies that its use should be managed in an international and institutionalized form.

ARTICLE 23

International Regime

State parties adhering to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the use of our primordial natural resource composed by a relatively stable state of the Earth System, one that is very similar to that of the past 12,000 years. This provision shall be implemented in accordance with Article 22 of this Agreement.

ARTICLE 24

Main Purposes of the International Regime

The main purposes of the international regime to be established shall include:

(a) **Ecosystem Services of Global Interest**

The Ecosystem Services of Global Common Interest are all the biogeophysical processes performed by the ecosystems that contribute to regulating the stability of the Earth System within the safe operating space. These services, although originated in ecosystems located in territories under the jurisdiction of sovereignty states, are spread diffusely in the Earth System, providing benefits to all humankind, thus they are inevitably global and a common interest.

(b) **Credits over the Common Intangible Heritage**

Ecosystem Services of Global Interest are considered all the benefits of the Earth System provided by the biosphere. Because they contribute to the maintenance of the state of the Earth System within the safe operating space, they generate a credit on behalf of the state that exercises sovereignty or sovereign rights over the ecosystem infrastructure that provided those ecosystems services.

(c) **Debits over the Common Intangible Heritage**

The chemical, biological and physical processes resulting from human activity that are conducive to pushing the Earth System out of the safe operating space generate a debit on behalf of the state that exercises sovereignty or sovereign rights over the place where this activity develops.
Because they undermine the stability of the Earth System, they constitute a depreciation of the common heritage.

(d) **Common Metric**

It is necessary to build a common standard pattern that represents the impacts (positive and negative) of each country on the structure and functioning of the Earth System. Conceptually, this new metric should be an aggregation of indicators that represent core processes that regulate the stability and resilience of the Earth System. This new metric should be based on the best available scientific knowledge.

(e) **Life-Support Unit**

The common standard pattern could be named "LSU – Life-Support Unit" and should be composed of an aggregation of PB indicators ("control variables"): stratosphere ozone depletion, aerosol loading, climate change, ocean acidification, biogeochemical flows (e.g., nitrogen, phosphorus), novel entities, biosphere integrity, land-system change and freshwater use.

(f) **EcoBalance**

Ecobalance is the difference between the positive and negative contributions of each State party to the maintenance of the *Safe Operating Space of Humanity*, that is, it is the difference between the production and consumption of LSUs. It allows us to realize the status of the relationship of each state with the common heritage, and should be the base criteria for the building of a system of contributions and compensations for its maintenance.

(g) **System of Contributions**

The basic criteria to establish the contributions of each state for the common heritage are the different balances of each country for the maintenance of the Earth System within the limits of a Holocene-like state of the planet. All parties, depending on internal policies, might improve their balance relative to the common heritage, either through the encouragement of environmental efficiency and preservation or restoration of ecosystems.

(H) **An Intermediate Space**

The new legal fiction of the Earth System should function as an intermediate space between State parties, where each state could understand the contributions from all the others and define its own performance strategy in relation to the common heritage, taking into account the prediction of the behaviour of other State parties.

(J) **Agreed Value for Each LSU**

Using all the best available economic information about costs of environmental damages and benefits of ecosystem services, we must construct one monetary value for the production and consumption of each LSU. This value will be defined through a Convention.

(l) **Coordination Functions**

With the definition of a new object of law and governance, a new or a reconverted international organization should emerge. It should have the capacity to address the Earth System as a whole, tackle the sort of challenges we are facing and assure the coordination tasks. It consists of receiving and redistributing the contributions of each State party and gathering the different interests in play, negotiating and adopting the necessary resolutions.

(m) **Resilience Priority**

The funds resulting from the accounting system payments should be used for setting compensation and restoration agreements with countries that exercise sovereignty on priority ecosystems for the maintenance of the stable regulation of the Earth System.

(n) **Historical Responsibility in the Use of Common Heritage**

The different historical responsibilities are well recognized in the use of this vital heritage for humanity. The different negative and positive contributions, the previous lack of knowledge about the global and cumulative consequences of the human activities, and the recent knowledge of the role of well-determined ecosystems, whose destruction could result in abrupt consequences in the regulation of the Earth System, should be appropriately weighted in the formulation of correction factors in the redistribution system. The common purpose of restoring this heritage within the levels necessary to ensure the sustainability of future generations of all the people of the world is a common objective to all members of the human species. The past cannot preclude the construction of the future.

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OUTRAS FONTES

CBD – convention on Biological Diversity

Global Commons UNEP- Law Division
http://staging.unep.org/delc/GlobalCommons/tabid/54404/Default.aspx

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PARTE II Common Home of Humanity Survey

Building the first 3-years institutional strategy together

8.1. O Projeto

Nascido no Porto em 2007, o projeto Condomínio da Terra teve desde a sua origem o objetivo de procurar soluções teóricas e práticas para o problema da inadequação do conceito de soberania refletir a realidade global, una e interdependente do Sistema Terrestre. Este projeto transformou-se na Casa Comum da Humanidade que hoje é uma parceria internacional que junta juristas e cientistas ligados às ciências naturais e sociais de todo o mundo no âmbito de uma parceria informal entre o Curso de Doutoramento em Ecologia Humana da Universidade Nova de Lisboa, Universidade do Porto, Universidade de Coimbra, University of Auckland e o Instituto International de Derecho y Medio Ambiente de Madrid, University de Siena (Indicadores ecológicos), Australian National University, Planetary Boundaries/Stockholm Resilience Centre (Ciências do Sistema Terrestre), University of Curtin in Perth Australia, e o Global Footprint Network (Metricas). Foi igualmente iniciada uma colaboração próxima com a ESA - Agência Espacial Europeia.

O resultado desta já longa investigação aponta como origem estrutural da tragédia resultante do uso desregulado do Sistema Terrestre, o facto do Sistema Terrestre não existir juridicamente, cujo o resultado dá origem a que ser utilizado como *res nullius*. Essa será mesmo a primeira causa estrutural da crise ecológica.

A motivação aglutinadora desta equipe multidisciplinar de académicos de diferentes áreas, foi o reconhecimento de que uma nova abordagem jurídica global é um pressuposto para a construção de uma solução que nos permitirá construir a Casa Comum, onde a interligação entre direitos humanos e meio ambiente pode encontrar um *locus* de representação social. A visão do papel central do direito e dos juristas nesta missão pluridisciplinar, começa a encontrar ecos um pouco por todo o mundo. Na recente

Conference Global Pact for the Environment, que teve lugar na Universidade de Columbia, Nova York, o Prof. Jeffrey Sachs afirmou: "This initiative for a Global Pact for the Environment calls on the world's leading jurists to help craft an agreement that in my view should have two strong bases," said Sachs. "One is the legal framework rights to environmental safety, climate safety, protection of biodiversity, standards of behavior and clear methods for protecting those rights. The second should be a clear global governance based at the United Nations." Said Sachs, "We have a UN Security Council for War and Peace. We need, in my personal view, a UN Security Council for the Environment."

8.2. Metodologia da pesquisa

A formação deste grupo de pessoas que suporta neste momento o projeto "Casa Comum da Humanidade" não obedeceu a um plano prévio de seleção, antes pelo contrário, emergiu de um processo a que poderíamos chamar de seleção natural. Aliás, a ter existido alguma seleção, essa terá ocorrido apenas na fase elaboração das listas de convidados para oradores. Depois do contacto inicial possibilitado por estes eventos, foi no exercício da partilha de pontos de vista e interesses comuns que resultou a formação de um grupo pluridisciplinar com origens espalhadas um pouco por todo o mundo, que irá em breve dar origem a um grupo formal, a constituição de uma nova pessoa coletiva: a Casa Comum da Humanidade.

Como este processo foi de resultado de processo involuntário, nunca o grupo se tinha debruçado sobre o seu próprio processo de formação, tentando perceber qual motivação e compreensão detalhada das suas crenças, atitudes, valores e interesses que levaram ao encontro destes atores sociais neste contexto social específico.

No sentido identificar os sentimentos e valores subjacentes que estiveram na base da formação espontânea deste grupo, de mapear as disponibilidades e aptidões individuais, bem como de perceber as expectativas que cada participante tem relativamente à Casa Comum da Humanidade, decidiu-se realizar uma pesquisa qualitativa com os seguintes objetivos preliminares:

- Compreensão preliminar de perceções individuais;
- Identificar quais os valores comuns e o significado pessoal do projeto;
- Grau de envolvimento;
- Questões que estão em todas as mentes.

E os seguintes objetivos específicos:

- Identificação de pontos fracos e pontes fortes do projeto;
- Averiguar os motivos que levaram ao envolvimento de cada um neste projeto;
- Conhecer a opinião dos envolvidos sobre o percurso já realizado;
- Identificar expectativas para fundar a construção de uma estratégia comum;
- Descobrir fatores que influenciam a perceção externa da Casa Comum da Humanidade;
- Identificar a motivações;
- Competências e valor que cada um traz ao processo;
- Da interação construir um sentido para o próprio projeto;
- Estabelecer uma estratégia institucional de 3 anos.

Para a realização desta pesquisa foi enviado por email um conjunto de questões, cuja ordem e redação permaneceram invariáveis para todos os entrevistados, combinando perguntas abertas e fechadas, sem limitação de espaço, onde o entrevistado tem a possibilidade de desenvolver as suas ideias sobre a questão proposta.

Uma vez que o "entrevistador" está também envolvido no projeto, e que o seu contributo é da maior relevância para interagir com os restantes participantes na obtenção dos resultados, ele próprio preencheu o questionário.

O grupo focal foi selecionado entre os autores do Livro SOS- Treaty, e outros elementos provenientes do Steering Committee da Casa Comum da Humanidade. No total a pesquisa foi enviada para 24 pessoas (18 membros do Steering Commitee e 6 membros do Board). No total foram recebidas 11 respostas. As respostas reforçaram as convicções já existentes e ajudaram a esclarecer os pontos de vista e os pontos fortes de quem respondeu à pesquisa.

Para isto, criou-se um formulário, que na essência pretendia dar criar uma perceção comum relativamente a estes assuntos:

- Strength
- Weaknesses
- Short-term challenges
- Mid-term challenges
- Long-term challenges
- Overall definition of sucess
- Current responsability
- Valuable input/potential role

8.3. Perfil dos Entrevistados

ALESSANDRO GALLI

With 10 years' experience on sustainability issues and indicator related projects, Alessandro's research focuses on analyzing the historical changes in human dependence on natural resources and ecological services through the use of sustainability indicators and environmental accounting methods. Currently, Alessandro is a Senior Scientist and the Mediterranean-MENA Program Director at Global Footprint Network. Previously, he has been working as technical advisor with the Emirates Wildlife Society (EWS- WWF) on the Al Basama Al Beeiya (Ecological Footprint) Initiative in the United Arab Emirates. Alessandro holds his PhD degree in Chemical Sciences from Siena University.

Alessandro is co-author of several publications including 30 articles in peer-reviewed journals such as Science, Global Environmental Change, Ecological Economics, Ecological Indicators and Biological Conservation, as well as WWF's Living Planet Report 2008, 2010 and 2012. He is also member of the Editorial Board of the Journal Resources: Natural Resources and Management and acts as reviewer for several academic journals. Alessandro was a MARSICO Visiting Scholar at University of Denver, Colorado, USA, in April 2011.

Key Research Interest: ecological footprint, human dependence on natural resources and ecosystem services, global environmental changes (including their socio-economic drivers), land use, resource management, sustainability, sustainability indicators, environmental accounting.

ALEXANDRA ARAGÃO

Maria Alexandra de Sousa Aragão is Professor of European Law at the Faculty of Law of the University of Coimbra, Portugal since 1996. She has a Master's degree in European Integration and a PhD in Public Environmental Law. She is holder of Jean Monnet modules on European Governance and European Environmental Law. She represents Portugal at the *European Observatories* on *Natura 2000 Network* and *Water Framework Directive*. She is member of the 'Avosetta' group of experts in European Environmental

Law and of the Advisory Board of the European Environmental Law Forum. She has authored numerous works on environmental law and governance, and her research interests are mainly focused European environmental law and the core environmental principles: polluter pays, precaution, integration and high level of protection. A list of publications and research activities can be found in: https://apps.uc.pt/mypage/faculty/aaragao/pt .

ANA BARREIRA

Ana Barreira has a degree in Law from the Complutense University has two master's degrees in Law: in Environmental Law (University of London) and in International Legal Studies (New York University). She is a founding member of the Spanish non-profit organization, Instituto International de Derecho y Medio Ambiente de Madrid, where she has developed his professional activity in several areas of environmental and political law. Since 2005 she is the lawyer of Oceana Europa, an international NGO specialized in the protection of the oceans. She has worked on projects related to environmental and political legislation in England, Albania, Mexico, Portugal, Republic of Montenegro, Republic of Serbia and Slovakia. He was part of the drafting team of the Spanish environmental framework (1995) and provided legal advice to the Spanish Ministry of the Environment for the Spanish Presidency of the EU mainly for the preparatory process for the World Summit on Sustainable Development (WSSD). Participated in international negotiations, such as Climate Change, PrepComms for WSSD, the UNECE meeting for Rio +20.

FERNANDO PEREIRA

Fernando Rodrigues Pereira has a degree in Public Relations / Business Communication from Universidade Fernando Pessoa (Porto, Portugal), where he also taught in Communication, Competitive Intelligence, Public Affairs and Lobbying for about 10 years. Graduate at Univ. Aix Marseille in Competitive Intelligence (Marseille, France). Professional experience: He has held management positions in multinational companies such as McCann Erickson and D & E / Weber Shandwick and in national agencies such as NTM and Press à Porter.

Since 2014, he has been the leader of the Prestomedia Group in Portugal, a Euro-latam communication group, and is a Senior Consultant at CCCP - Porto's Consulting and Communication Company. (https://www.facebook.com/cccp.pt/)

In the field of public affairs and communication, during the last 20 years, he has developed and directed various projects and campaigns as a consultant and advisor to various public bodies and personalities. He is Senior Consultant at RetiSpain for the Portuguese market since 2014. Currently, since 2016, he is the Executive Director of CCCP - Communication and Consulting Company of Porto

FRANCISCO FERREIRA

Francisco Ferreira is a Professor with the Department of Sciences and Environmental Engineering of the Faculty of Sciences and Technology of the New University of Lisbon, Portugal, and a member of CENSE – Center for Environmental and Sustainability Research. His main research interests are within the areas of air quality and climate change. He has published numerous peer-reviewed articles in scientific journals and coordinated several national and international research projects. He was President of *Quercus*, an environmental non-governmental organization from 1996 to 2001 and a member of the national board until 2011. He was a member of the National Council on Environment and Sustainable Development and of the National Water Council. Until the end of 2015, and for almost ten years, he was the author and presenter of a daily show on national public TV entitled "The Green Minute". He is currently the President of ZERO – Association for the Sustainability of the Earth System.

KLAUS BOSSELMANN

Klaus Bosselmann, PhD, is Professor of Law at the University of Auckland. He is the founding director of the New Zealand Centre for Environmental Law and teaches in the areas of international environmental law, global governance, environmental constitutionalism and legal theory. He has served as a consultant to the OECD, the EU and the governments of Germany and New Zealand, was a legal advisor to the Earth Charter Drafting Committee and has been a visiting professor at leading universities in Europe, North America, Brazil and Australia. Prof Bosselmann is Chair of the IUCN World Commission on Environmental Law Ethics Specialist Group, Co-Chair of the Global Ecological Integrity Group and executive member of other international professional bodies. He has authored over a dozen books including the award-winning *Im Namen der Natur* (1992), *When Two Worlds Collide* (1995), *Ökologische Grundrechte* (1998), *Umwelt und Gerechtigkeit* (2001) *The Principle of Sustainability* (2008), *National Strategies for Sustainability* (2014) and *Earth Governance* (2015).

NATHALIE MEUSY

Nathalie Meusy is, since November 2008, the Head of the Coordination Office on Sustainable Development at the European Space Agency (ESA) in the Strategy Department attached to the Director General. Prior to the creation of this office, she launched the sustainable development initiative at ESA in 2007.

She has, since then, developed the first framework policy on sustainable development for ESA, to be applied in its environment and energy activities, its programme activities and in the governance and ethics of the whole organisation as well as the first report on sustainable development for a space agency in Europe. Nathalie Meusy obtained Law degrees from the Paris XI and Besançon Universities and studied thereafter Social Sciences at La Sorbonne University (Paris). She started her career in journalism and intellectual property related to photographic work (Magnum Photos Agency). Thereafter,

Ms. Meusy joined ESA in 1987 as a lawyer-administrator in the Human Resources Department. She supported, as Head of Social Policies, all ESA establishments and directorates from a legal and social point of view for15 years.
About ESA: This is a Research and Development inter-governmental organisation in charge of space projects and programmes at European level, which now counts 22 Member-States (20 member-States in the EU plus Norway and Switzerland), 9 other EU Member States have Cooperation Agreements with ESA. Canada also takes part in some programmes under a Cooperation Agreement.

SANDRA ENTEIRIÇO

Sandra Enteiriço has a degree in Economics - Postgraduate in Finance for Executives and several courses in behavioral area (time management, leadership, assertive communication). She has held public functions, especially in the environmental area, since the beginning of his career twenty years ago. He started the professional course in the management of urban waste at the General Company of Development, S.A, responsible for the management of about 60% of urban waste in Portugal. In 2001 she was advisor to the Secretary of State for Planning of the XIV Constitutional Government, and from 2014 to 2017 served as advisor to the Minister of the Environment.
In 2008, she was involved in the area of Climate Change, having served as Chief Economist in the Technical Secretariat of the CECAC (Executive Committee of the Commission on Climate Change) and the Portuguese Carbon Fund and, after 2012, as manager of the managed Environmental Funds by the APA, IP, namely the Portuguese Carbon Fund, the Water Resources Protection Fund and the Environmental Intervention

PAULO MAGALHÃES

Paulo Magalhães is a researcher at the Interdisciplinary Centre of Social Sciences CICS.NOVA (CICS.NOVA.FCSH/UNL). He has a degree in Law from the Catholic University of Porto and a post-graduation in Environmental Law at Coimbra University. Today is in PhD Programme "Human Ecology" at Universidade Nova de Lisboa where he works in the concept of "*Common Intangible Natural Heritage of Humankind*". He is the author and coordinator of the Earth Condominium Project that propose a new concept to managing our use of the Earth System.

PRUE TAYLOR

Prue Taylor teaches environmental and planning law to graduate and undergraduate students at the School of Architecture and Planning, University of Auckland, NZ. She is the Deputy Director of the New Zealand Centre for Environmental Law and a long standing member of the IUCN Commission of Environmental Law and its Ethics Specialist Group. Prue's specialist research interests are in the areas of climate change, human rights, environmental and commons governance, ocean law and policy, property rights and environmental ethics. She has authored numerous books and articles in these areas. Her book, *An Ecological Approach to International Law: Responding to the Challenges of Climate Change* (Routledge), won a NZ Legal Research Foundation Prize.

In 2007 she received an outstanding achievement award from the IUCN in recognition of her contribution, as a world pioneer on law, ethics and climate change.

WILL STEFFEN

Will Steffen is a Councillor on the publicly-funded Climate Council of Australia that delivers independent expert information about climate change, and is an Earth System scientist at the Australian National University (ANU), Canberra. He is also an Adjunct Professor at the University of Canberra, working with the Canberra Urban and Regional Futures (CURF) program, and is a member of the ACT Climate Change Council.

From 1998 to mid-2004, Steffen served as Executive Director of the International Geosphere-Biosphere Programme, based in Stockholm, Sweden, and is currently a Senior Fellow at the Stockholm Resilience Centre. His research interests span a broad range within the fields of climate and Earth System science, with an emphasis on incorporation of human processes in Earth System modelling and analysis; and on sustainability and climate change, particular in the context of urban areas.

8.4. RESULTADOS

Highlights of the survey

- **Uniqueness of mission**

  - truly global,
  - interdisciplinary,
  - innovative governance model,
  - legal construct based on science,
  - Earth System-based solutions,
  - heritage aspect,
  - redefining global commons

- **Reason to support (real or potential):**

  - necessary,
  - different,
  - sustainability through structural changes,
  - resonate at personal level,
  - complements existing global negotiation frameworks,
  - applied Earth jurisprudence,
  - simple and sound,
  - respectful (to ES)
  - global leadership model,
  - new perspective on human self-organization,
  - utopia,
  - compelling framework,
  - merit of ethics policy & law,
  - possible solution to all environmental externalities,
  - science-based Earth System perspective.

- **Strengths:**

  - intuitive,
  - ethical,
  - holistic,
  - embraces legality,
  - multi-disciplinary,
  - multi-stakeholder,
  - scientific,
  - evidence-based,
  - innovative

- **Weaknesses:**

  - resources,
  - finance,
  - communication and PR,
  - organizational structure,
  - lack understanding of risks and threats

- **Challenges:**

  - legal independence and set-up (ST),
  - **financial security** (ST),
  - **demonstrable capacity** (ST),
  - capturing global attention and diverse support base (SMT),
  - keeping them and mobilizing effective action (MLT),
  - **clarity in meaning of global governance** (MT),
  - **engagement with progressive states and strategic allies** (SMT),
  - credibility and acceptability of ESAF (MLT),
  - redefining global commons and creating coalitions (MLT),
  - legal recognition of the ES (MT),
  - **handling neo-liberal economic paradigm** (MT),
  - avoid polarizing politics? (LT),
  - catalyze change (LT),
  - **maintain momentum and relevance of mission without exhausting key people** (LT),
  - Staying **inspirational but realistic**

- **Overall definition of success:**

  - legal recognition of the Earth System as an intangible human heritage,
  - global buy-in of Earth System legislation,
  - credibility to advise governments (scientific, legal and diplomatic),
  - full independence,
  - **Accountable, transparent** strong inclusive leadership,
  - integrity and reputation,
  - impactful outreach (awareness and education),
  - UN membership,
  - number of states who sign-up to the mission

- **Available skill set:**

  - Earth Science,
  - Indicators and measuring sustainability,
  - Law and Governance,
  - Philosophy and ethics,
  - UNFCCC negotiations,
  - Strategies and International networks

- **Active gaps:**
  - Strategies and international networks,
  - finance and business development,
  - communication,
  - education

8.5. ANEXOS

Key notes	*Alexandra Aragao*	*Alessandro Galli*	*Ana Barreira*	*Fernando Perreira*	*Francisco Ferreira*	*Klaus Bosselmann*	*Nathalie Meusy*	*Paulo Magalhaes*	*Prue Taylor*	*Sandra Entririco*	*Will Steffen*
Uniqueness of mission		Heritage of mankind, re-defining global commons		Legal construct based on science	Innovative new model for governance	Truly global interdisciplinary governance model.	Vision/solution builds from safe operating space treaty	Harmony of individual & collective responsibility	interdisciplinary perspective on global ecological governance	New global governance model	Earth System perspective advises global governance
Reason to support	Different approach	sustainability through structural change	Necessary initiative to find solutions	Belief in pathway	Complimentary framework for int'l negotations.	Applied Earth jusrispridence. Simple sound complimentary	Respect/ conservation of Earth. Global leadership.	Founder + perspective on human self organisation	compelling framing potential & merit of ethics, policy and law	Possible solution to all environemntal externalities	Systems perspective, scientific basis.
Strength	Intutive underlying ethical stand	prescribes a global model to addresss sustainability	Embracing the legality	Addressing key problems wholistically	Bringing diverse institutions together	interdisciplinary approach.	Diversity converging to protect safe operating space	Science, law and evidence based work.	Diversity of representation	Innovative concept	Addresses Earth system as a whole
Weaknesses		Ease of communication + Financial security	Resources and communicati on	Financial stability		Funding, communication PR	Organisational structure & financing	Resources & financial stability.	Limited resources	Communication	Assessment of risks & threats
Short-term challenges	Capturing global attention and diverse support base Credible, meantingful acceptable index	CHH Legal independence + financial security	Strong legal and institutional	Demonstrate capacity to deliver mission	Operations. Inspired, realistic action	Finding strong & strategic allies.	Awards & prizes/ international attention	Institutional organisation. Communication	Develop credible profile+ effective partnerships	Catch attention of other states. Finance	Legal status of the Earth System
Mid-term challenges		Re-defining global commons + creating coalitions	Diverse, credible and multidisciplin ary buy-in	Be the credible voice that influences change	Capturing global attention, recognition and buy-in. Projecting credibility internationally		Mobililzing effective action at inter-governmental, governmental and local levels	Earth System recognised for heritage value		Clarity in what global governance model means	Handling neo-liberal economic paradigm
Long-term challenges		Global recognition and incorporation of Earth System	Avoid polarizing politics			Engagement of several progressive states		Successful CHH mission management	Maintaining momentum & energy	Maintaining a relevant message.	Maintaining influence of Earth System legal status
Overall definition of success	Global buy-in on need for Earth System legislation	Scientific, legal and diplomatic credibility to advise	Transparent, strong, inclusive leadership +	Credibility, strength and reputation	Credible, transparent and widely endorsed	Secure funding. Credible. Strong education programme	recognition of Earth System as intangible human heritage	Recognition & credibility of its strength.	International credibility. Clear and inspiring communication.	Credibility. State memberships + UN. Effective communication.	Scientific credibility. Global recognition.
Current responsibility	Conceptual support	Board member, networking and scientific	Legislative and policy alignment	Advisory board	Advisory board + assistance with	Co-chair of Scientific Advisory Board	Networking, lobbying & board member	Founder and all-rounder	Ambassador	Represent Government of Portugal at CHH	Chair - Scientific Advisory
Valuable input/ potential role	Drafting legal steps	All of the above + Contribute to develop ESAF	Legal & admin establishmen t + CHH mission development	Operations, strategy, communication, lobbying, PR	International negotiations in perspective + build strategy towards goals	Expert advise on ecological law & governance. Stakeholder facilitator.	Active role in legal aspects of CHH mission +, mobilization of network.	Founder, ambassador, coordinator, facilitator, supervisor.	integration of concepts of commons with policy and law. Communiaction and advocacy.	Advisory Board member representing government perspective	Scientific supervision, support and advise.

NAME: Alessandro Galli

INSTITUTION: GFN and CHH

ROLE IN THE CURRENT ACTIVITIES OF CHH: Board member, international coordinator (supposedly) and scientific advisor.

Q1. What is the one main reason for you/ your institution to support CHH?

I support CHH as I came to realize in the past few years that addressing sustainability can only be possible if the enabling/structural conditions that affect our decision making process is addressed first. My sense is that our society finally has most of the scientific knowledge needed to understand the problem and identify solutions but our governance and law system is completely unequipped to be able to favor "sustainable choices". So, we need to change the rule of the game.

Q2. What is the most attractive feature of CHH?

The idea of considering the Earth System (in its functioning state) as a heritage of mankind, to be legally protected and regulated/managed. This feature has in it 2 very attractive – for me – concepts:

1) the fact that it proposes a new governance systems that goes beyond national sovereignities and divisions

2) a way to speak about global common as a positive (rather than negative) sum game.

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

In this initial phase, I aim to act as the international coordinator of the initiative, thus spreading the news about CHH and create a network of supportive organizations. I also plan to support the initative as scientific advisor thus working on related written documentation and various project proposals/applications

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

Yes, In a second phase of the CHH – one CHH is an independent entity up abd running – I aim to contribute to the work around the development of the ESAF framework. I would like to work to make the scientific case for an Earth System Accounting Framework and after collaborate with various research groups around the world for its development.

Q5. What, according to you, would define the strength of CHH as an organisation?

To be credible scientifically, legally and from a diplomatic viewpoint to be able to lead the way towards a complete re-organization of the world governance system (as well as to lead the implementation of a related scientific research agenda).

Q6. What, according to you, would define success of CHH in the short term and in the long-term?

Short term success (1-2 years from now): CHH is established as an independent global organization, has core funding secured to operate for 3-5 years to come and a dedicated core staff of 3 full time equivalents. A coalition of states is starting to shape up (2-3 core governments deeply and activelty engaged) by end of 2018/early 2019.

Medium term success (3-7 years): the global commons are back in the political agenda (not just climate issues) and at the core of civil society discussions. A coalition of states (at least 10 states) is established, which are signatory of the CHH Statutes and actively lobby in favour of the CHH message/goal. Sessions of the UN general assemly are held to start discussing the CHH governance framework and the research needs to make the ESAF real (I am envisioning a process similar to the one which led to the idenfitication and agreement of the SDGs and associated indicators). A network/coalition of research institutions is created, to start working on the ESAF proper development and implementation.

Long term success (7 to 14 years from now): the Earth system is recognized as a legal object (i.e., CHM) and agreement is reached at UN level (or equivalent – should the UN not exist anymore) over the EASF system. The CHH "goals" replace the SDGs and represent the global post-2030 agenda.

Q7. What do you see as the single biggest challenge faced by CHH today?

Being perhaps too visionary to be acceptable by current government leaders. Fundraising and medium-term financial stability.

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

1) Scientific integrity and robustness in support of a core legal construct

2) transparency and involvment of as many stakeholder groups and minorities as possible

3) Easy and effective communication

Q9. What do you see as the one important CHH engagement and/or achievement in

2018 CHH is established as an independent global organization and has core funding secured to operate for 3-5 years (with a dedicated core staff of 3 full time equivalents)

2019 by early 2019 a coalition of States is starting to shape up with support from 2-3 core governments secured (they are signatory of the CHH Statutes).

2020 A network/coalition of research institutions has been set-up, to start working on the ESAF development and implementation

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

Short term: financial stability/viability and acceptance by governments

Long term: acceptance by governments

N**AME:** Alexandra Aragão

INSTITUTION: FDUC

ROLE IN THE CURRENT ACTIVITIES OF CHH: Active supporter

Q1. What is the one main reason for you/ your institution to support CHH?

I suppot because I belive it is a different approach to the ususal environmental protection/ nature conservation.

Q2. What is the most attractive feature of CHH?

The intuitive underlaying ethical stand.

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

Help to draft the next legal steps.

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

Again help in designing the legal propositions/statements of the CHH.

Q5. What, according to you, would define the strength of CHH as an organisation?

The number and diversity of collective suppoorters (states, governmental and non governmental organizations).

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

Getting the attention of persons/ peoples / media / academia / states / organizations to make the need of a new legal statute for the earth system an obvious need.

Q7. What do you see as the single biggest challenge faced by CHH today?

Geeting everybody's attention despite the present the overflow of (mostly junk) information.

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

Define legal statutes of the Earth System including the right to be in a certain ecological condition)

Get formal recognition of the legal statutes (UN).

Create a set of indicators/index of positive and negative contributions to the good / bad condition of the earth system (different from Ecological Footprint)

Create a scoreboard.

Q9. What do you see as the one important CHH engagement and/or achievement in

2018

UN recognition/support of the new legal entity

2019

UN /States/ organizations/ peoples subscription of legal statutes

2020

Publication of the index and scoreboard.

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

Get international attention / media and social media attention.

Developing a credible /meaningfull /acceptable index.

NAME: **Ana Barreira**

INSTITUTION: Director - Instituto Internacional de Derecho Y Medio Ambiente - Madrid

ROLE IN THE CURRENT ACTIVITIES OF CHH: Member Steering Committee

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Q1. What is the one main reason for you/ your institution to support CHH?

I have been working in the field of environmental law in the last 24 years and I find this initiative necessary to provide action and solutions to Earth depletion.

IIDMA is an environmental law organization. The concept of CHH is of great importance in order to advance to providing solutions.

Q2. What is the most attractive feature of CHH?

The legal concept which embraces CHH.

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

All my experience in the field of environmental law, international law as well as my experience managing NGOs

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

Yes, as first I can support in its establishment and after in its development.

Q5. What, according to you, would define the strength of CHH as an organisation?

The assembly of many diverse profiles. It is a truly multidisciplinary organization which is what our CHH requires.

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

Transparency, strong leadership but at the same time inclusive leadership, dialogue, good communication strategy, confidence among their members, avoidance of links to political organizations, strong independence….

Q7. What do you see as the single biggest challenge faced by CHH today?

LAck of resources.

Weak communication among its members.

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

- First having legal personality with a strong institutional setting
- Avoid to be identified with politicians
- Atract prestigious independent “global thinkers”

Q9. What do you see as the one important CHH engagement and/or achievement in

2018

Acquiring legal personality

the Porto Conference

Having a good communications package

2019

Becoming a well known institution and that international organizations start considering the concept of CHH as an important area they must work on.

2020

The UN GA makes a declaration on the CHH

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

NAME: **Fernando Rodrigues Pereira**

INSTITUTION: CHH

ROLE IN THE CURRENT ACTIVITIES OF CHH: CHH member of Steering Committee Board

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Q1. What is the one main reason for you/ your institution to support CHH?

I believe in the pathway proposed by CHH

Q2. What is the most attractive feature of CHH?

"Our Common Home as a Legal Construct based on Science"

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

. organizational skills

. skills on Strategy, Communication, lobbying and public affairs

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

Yes, because there will be a work plan to be followed and I can put all my skills on helping CHH to reach these goals and objectives

Q5. What, according to you, would define the strength of CHH as an organisation?

- The capacity to look and attack some central problems with an *overall effect* perspective: scientific, economic, legal and antropological perspectives.

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

Short term: create an organization capable to produce work oriented to our major goals

Long term: be one of the voices that can influence the change

Q7. What do you see as the single biggest challenge faced by CHH today?

Its birth with sustainable basis that allows to concentrate its strenghts on attacking the problems without any other concerns, like the financial sustainability of the organization

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

- Credibility
- Strength
- Reputation

Q9. What do you see as the one important CHH engagement and/or achievement in

2018

Congress

Positionning

Swedish prize

2019

Consolidation of the structure

Globalization of the message

2020

Reputation

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

Short-term: to form a team built on its scientific merit with very favorable conditions to work

Long term: built a well known reputation that will allow to influence the global decision-makers

NAME: **Fernando Rodrigues Pereira**

INSTITUTION: CHH

ROLE IN THE CURRENT ACTIVITIES OF CHH: CHH member of Steering Committee Board

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Q1. What is the one main reason for you/ your institution to support CHH?

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Swedish prize

2019

Consolidation of the structure

Globalization of the message

2020

Reputation

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

Short-term: to form a team built on its scientific merit with very favorable conditions to work

Long term: built a well known reputation that will allow to influence the global decision-makers

NAME: **Francisco Ferreira**

INSTITUTION: ZERO – Association for the Sustainability of the Earth System

ROLE IN THE CURRENT ACTIVITIES OF CHH: Member of the Boar4d

Q1. What is the one main reason for you/ your institution to support CHH?

- The project is fully in line with the goals of ZERO;

- The concept makes sense to be discussed and implemented and may enable further developments at the global level;

- it can be seen as a complementary framework to current international negotiations of environmental critical issues;

- It enables different people and institutions to build a new model of understanding and possible ruling of the world;

Q2. What is the most attractive feature of CHH?

- The utopian goal

- The diverse institutions that may join

- The innovative approach

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

- To help the bureaucratic processes in the first stages

- The knowledge of international negotiations

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

- ZERO will concentrate more in the goals and discussions leaving its bureaucratic support that is helping the project for now

Q5. What, according to you, would define the strength of CHH as an organisation?

- The capacity to create a global effort to implement a new innovative approach to define the relationships between States, communities, organisations.

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

ST: become a legal entity with clear governance rules and objectives

LT: to be heard by international institutions and to have its proposals undertaken by States; to be considered as an international credible entity to frame the work of environmental global problems

Q7. What do you see as the single biggest challenge faced by CHH today?

- Get international institutions, particularly countries, to join

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

- Have extremely credible and feasible objectives with a pathway that makes sense and is transparent for all the participants that may join

- Become endorsed by other notable instituions / countries

- Set up a framework of action that is inspirational and realistic

Q9. What do you see as the one important CHH engagement and/or achievement in

2018 – Great Conference

2019 – Several countries and international well-known and credible institutions as part of the CCH

2020 – Start to become a partner at the international negotiations level

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

ST: to get a sufficient number of international members that would support the voice and action of the CCH

LT: be recognised internationally

COMMON HOME OF HUMANITY

NAME: **Klaus Bosselmann**

INSTITUTION: University of Auckland

ROLE IN THE CURRENT ACTIVITIES OF CHH: Co-Chair, Scientific Advisory Board

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Q1. What is the one main reason for you/ your institution to support CHH?

CHH is applied Earth jurisprudence, promotes a simple and sound idea and compliments similiar initiatives towards ecological approaches to law and governance I am involved with (Ecological Law and Governance Association, Planetary Integrity Project, UN Dialogue Harmony with Nature, eco-constitutionalism).

Q2. What is the most attractive feature of CHH?

The idea of Earth as a scientific, physical, ecological and ethical whole is timely and incraasingly popular. It fits the Anthropcene and the growing concern for long-term and truly "global" governance. CHH's most attractive feature is its interdisciplinary approach, i.e. from Earth scientists to environmental lawyers and – at least potentially – political institutions. This makes CHH credible.

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

My expertise in approaching law and governance from an ecological perspective (rather than the other way round). The paradigm shift "from environmental law to ecological law" (Oslo Manifesto) has taken hold in mainstream environmental law and will, over time, change methodology and directions of decision-making at all levels (global, regional, national and sub-national). However, we are talking decades here, not just years. It is important for CHH therefore to appeal to those interested in contextual, long-term decision-making (global governance institutions, think tanks, foundations, civil society networks, progressive governmental agencies) rather than current power centers (big states, corporate and finance sector).

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

I see my role as an advisor (from an social sciences and activists perspective) and facilitator between CHH and other stakeholders and intitiatives (see above).

Q5. What, according to you, would define the strength of CHH as an organisation?

Its interdisciplinary approach and expertise as mentioned. CHH's real (=political) strength depends on finding strategic allies: international organisations (e.g. UNESCO, EU agencies), global NGOs and individual governments or governmental agencies. Finding strong allies will be crucial for CHH's success.

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

The number and significance of strategic allies. In the short-term: NGOs, UNESCO, Portuguese government. In the long-term several progressive states (e.g. Norway, Finland, Netherlands, Germany, Malta, New Zealand) and UN.

Q7. What do you see as the single biggest challenge faced by CHH today?

Funding is a big challenge. One or two sponsors may be needed to run a small secretariat, get PR going and organize conferences. Important starting-point is a more elaborate website (showing partners, events and ways to get involved). Any difficulties associated with funding are to due to the short-term economic paradigm that most funding isnstitutions are caught up with, but should not deter us from trying. Good ideas take time. The idea of Earth as a legal entity certainly takes time to sink in and to understand its practical relevance. This makes it important to see CHH as an educational project rather than a quick fix response to the predicament of global environmental degradation.

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

1. Secure funding base.
2. Attract credible partners and allies (see above).
3. Run successful conferences and educational initiatives (incl social media!).

Q9. What do you see as the one important CHH engagement and/or achievement in

2018 Conference: academic, but involving political institutions. Establish a small secretariat.

2019 New partners: UNESCO, governmental agencies.

2020 UN-initiative: review of SDGs or UNGA resolution

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

Short-term: securing a solid funding base

Long-term: overcoming economic forces (dominating the UN, EU, virtually all governments) that will undermine the credibility of CHH once it becomes more prominent. Best remedy: find some credible partners (see above).

NAME: **Nathalie Meusy**

INSTITUTION: European Spacial Agency – Head of the Coordination Office on Sustainable Development

ROLE IN THE CURRENT ACTIVITIES OF CHH: Member Steering Committee Board

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Q1. What is the one main reason for you/ your institution to support CHH?

Being part of the CHH comes with my personal commitment towards the respect, the preservation and the restoration of our space ship, planet Earth. I have always been in favour of an ecological humanism. The role of human beings, the sole species that can decide on its extinction, is key. I strongly believe that something can still be done to help the Earth system to be revitalised. It is a matter of change in mindsets, a matter of accountability, a matter of consciousness be it individual or collective level. This consciousness was borne when humans came into space. This is also the reason why, being part of the European Space Agency, I can bring space role and tools into the debate to support the CHH and its actions towards the Environment. This can also constitute a strong position for Europe to show its leadership and launch a world-wide cooperation.

Q2. What is the most attractive feature of CHH?

The most attractive feature of CHH is the new vision concerning our space operating system and the solutions that can derive from it. It perfectly illustrates a new form of international cooperation where, through a network of committed entities and individuals, the principle of "from global to local" will be turned into concrete policies and actions in the interest of the whole humankind. Awareness actions for supporting the promotion of the SOS Treaty should be deployed in all layers of the society.

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

My contribution to the establishment of the CHH is my engagement towards the Earth and its Environment and the way I express it through multiple actions of awareness towards institutions or the general public (citizens) in writing, talking or exchanging with them. I, in particular wrote the introduction of the SOS Treaty book. But as a lawyer and sociologist I am always attentive to the evolutions and trends in our societies and try to propose innovative solutions for a better governance. I have been launching the Sustainable Development activity at ESA and was considered as a pioneer in this sector, I can help CHH founders and members to be pioneers for a new governance of the Earth system. Lastly, as a staff of the European Space Agency, I have many networks and contacts that can be mobilised and used t defend the CHH cause.

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

Once the CHH will be an independent legal entity, I imagine being more committed in my action as my role will be more defined and the organisation more structured.

Q5. What, according to you, would define the strength of CHH as an organisation?

The strength of CHH is its diversity, its multi-disciplinarity that nevertheless converge towards a single objective: protect the Earth Safe Operating System. An objective that should always federate and never divide.

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

Q7. What do you see as the single biggest challenge faced by CHH today?

The governance of it with, in particular its financing.

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

Q9. What do you see as the one important CHH engagement and/or achievement in

2018

2019

2020

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

In the short-term, the key success would be to obtain the recognition of the Earth system as Intangible Heritage of Humanity, and try to get some international prizes/ awards to catch the attention at international level for then in the longer-term to be able to undertake actions at inter-governmental, governmental and local levels and mobilising and joining forces in dedicated programmes/ projects (with regions, cities, universities, schools, associations, etc.)

NAME: **Paulo Magalhães**

INSTITUTION: Zero/ CHH

ROLE IN THE CURRENT ACTIVITIES OF CHH: Chair of the Steering Committee Board

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Q1. What is the one main reason for you/ your institution to support CHH?

The conviction that an evolutionary moment has arrived, and there is an inevitable and structural shift in the way how human societies organize themselves in the context of a limited planet of which they are part of. This shift necessarily requires a natural evolution from the actual state-centric international system to a new one in which the recognition of the existence of a real global common, which escape to the territorial dimension of states, require his recognition with the goal to be managed as common good on which we all depend.
Because it is not a technological challenge, discovery or conquest, but rather an intrinsic challenge of a human self-organization, this evolution is the greatest of the challenges for which mankind has passed
CHH presents itself as a model of the basic organization of a condominium, in which the existence of common property is overlapped with private property, and in this way, the interdependence between common interests and private interests is organized. I believe that the application of this model on a global scale has a much greater ability to portray and explain the superimposed reality between a global and interdependent Earth System, and a human society organized through independent states. Because CHH has this capacity, because it's grounded in science and the already constructed law, it seems to me to be a viable and realistic utopia.

Q2. What is the most attractive feature of CHH?

The most attractive feature of the condominium model is the fact that it makes possible the symbiotic harmonization of individual and collective interests, which was theoretically (for the economy and for law also) an impossibility. The CHH, by making a scale adaptation of this model, makes possible the coexistence of a global common good as a legally recognized common heritage (the favorable state of the Terrestrial System) in an overlapping way with the existence of sovereign and independent states. As a consequence of this recognition, the creation of a fair system of maintenance and management of the use of this global good is inevitable.
What seems to me most attractive, apart from the global and deep interdisciplinary approach, is this apparent simplicity of the model and its explanatory capacity of reality. The fact that CHH it is a legal construction based on the latest knowledge of science on the functioning of the Earth System, we can consider it a rational representation, but it does not cease to be equally grounded in the intuitive perception of the existence of something global from which all the live and human species depends,

that crosses all peoples, cultures, and religions in all geographies of the planet. We can consider it a modern scientific and legal representation of the previously inexplicable "mother nature". The truly Common Heritage of Humanity.

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

To continue this path of theoretical construction and construction of practical tools that allow us to concretize this evolution, always maintaining the prudent doubt and the humility of learning with everyone.

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

No. If everyine fill that my conribution still being necessary, I will continue building the home and the concept.

The possibility of the Common Humanity becoming not only a focal point for the exchange of knowledge between scientists of various areas of knowledge but above all a space of shelter, bond, and identity of a global citizenship, which requires a Locus where to anchor the Its existence. If Common House translates in practical terms into a heritage that unites us all, this new entity can become the space where common interests are discussed and developed, and where these and future generations have an identification and belonging.

Q5. What, according to you, would define the strength of CHH as an organisation?

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

Short-term - Construction of an administrative team, financial support, organization of the international conference with all necessary promotional material, and international launch of the campaign for the recognition of the terrestrial system as a World Heritage Site.

Medium-term - Recognition of the favorable state of the Earth System as a World Heritage Site

Long-Term - Construction and institutionalization of a management system for the use and maintenance of the favorable state of the Terrestrial System, with economic visibility.

Q7. What do you see as the single biggest challenge faced by CHH today?

To be able to assert itself not only as one among so many proposals for a solution, but to be recognized as one that is properly grounded in science and law, and which has a greater margin of progression and ability to explain the reality in which we live. The one that represents the claimed evolution and that is scientifically realistic and humanly viable.

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

Funding

Science evidence

Diversity os supporters /states and indivdual7 associative

Q9. What do you see as the one important CHH engagement and/or achievement in

2018 major conference in Porto, introducing CHH to the world

2019 - submission of the Earth System as common, intangible natural heritage to the World Heritage Commission of UNESCO

2020 - have a spreading base of support, both in human resources and in funding, and promotong the evolution of the ESAF

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

Short-term - Solid funding base
Long-term – To know always being an element of promoting and making evolution, without making big disruptions.

NAME: **Prue Taylor**

INSTITUTION: University of Auckland

ROLE IN THE CURRENT ACTIVITIES OF CHH: contributor to one publication

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Q1. What is the one main reason for you/ your institution to support CHH?

CCH conceptualises the problems we face in a new and compelling manner. CCH has begun the task for framing ethical, policy and legal responses in a manner that (while very challenging) has great merit and therefore potential. CCH helps us to communicate more effectively and therefore to advocate as a collective.

Q2. What is the most attractive feature of CHH?

The collective effort that we are engaged in and the fact that CCH has an interdisciplinary perspective on global ecological governance. In addition, CCH is currently comprised of people from a range of diverse cultures – ie not exclusively Anglo/American. This helps for the exchange of ideas and perspectives.

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

I think I can best contribute to discussion about ethical/legal concepts and their potential develop policy and law. In particular, I am able to contribute to the integration of new concepts of the commons and commoning, with policy and law. My experience in working on climate change issues and law of the sea issues will also be helpful.

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

I think I am best able to help through the communication of role and work of CCH, and through advocacy.

Q5. What, according to you, would define the strength of CHH as an organisation?

Its ability, together with other effective partners with long standing international credibility, to communicate a clear/inspiring and effective concept for global ecological governance.

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

Evidence of growing interest and support for the ideas of CHH. Partnership with other organisations that are supportive. A regular and growing profile at relevant international fora. Contributions from a growing array of disciplines. An evolving discourse about ecological responsibilities at all levels: global, international, regional, national, local. This would include signs of moving beyond traditional legal and policy responses, and a preparedness to try out novel concepts, as opportunities emerge.

Q7. What do you see as the single biggest challenge faced by CHH today?

Maintaining momentum and energy, without exhausting key people. Keeping faith as the tasks of CHH require a long term perspective. Developing and maintaining political support – where necessary and helpful. Ensuring that the mission of CHH remains coherent and focused.

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

I don't feel that I have the experience/expertise to helpfully answer this question.

Q9. What do you see as the one important CHH engagement and/or achievement in

2018 (note – I would probably add the same things as Klaus has here, but … in my view the support of some key nation states and their leadership would be critical. They can facilitate a willingness to discuss and explore CHH rather than treat it with suspicion and dismiss it.

2019

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

Both short and long term: Maintaining momentum/energy and focus while at the same time further developing the concept and ensuring support - without destructive compromise.

NAME: **Sandra Enteiriço**

INSTITUTION: Portuguese Government – Cabinet of the Minister of the Environment

ROLE IN THE CURRENT ACTIVITIES OF CHH: Representative of the Portuguese Ministry of the Environment, according to the Protocol signed in 15th July 2016

Q1. What is the one main reason for you/ your institution to support CHH?

The awareness of the need to find a new global governance model to address the current threats of the planet, namely climate change and the other "planet boundaries".

Q2. What is the most attractive feature of CHH?

The proposal of a new global governance model that may solve all the environmental externalities at once.

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

Portugal is the first “state” to join this mission. We hope we can help either by providing the “state” vision and by joining other “states” to CHH.

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

The development of the project will require different contributions of the members.

Q5. What, according to you, would define the strength of CHH as an organisation?

The innovative concept.

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

In the short-term:

- the application to the “Global Changes Foundation”

- the ability to communicate the concept of CHH in a way that everyones may understand

In the long-term:

- The capacity to move CHH to United Nations and gather States in this vision

Q7. What do you see as the single biggest challenge faced by CHH today?

The position of United States regarding climate change. This will make global community focus on solving “the climate change issue” and bring less avalilability to “move forward”.

Can be, in other hand, a strenght in the future.

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

- Scientific credibility;

- Involvement of the States;

- Communication capacity.

Q9. What do you see as the one important CHH engagement and/or achievement in

2018

- **Global Changes Foundation**
- **"Presentation" to UN**
- **Join other States**

2019

- **"Start the discussion" of the integration in UN**
- **Join States**

2020

- **integration in UN**

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

Short term: join States, financing

Long-term: Definition of the terms of the implementation of the global governance model.

NAME: **Will Steffen**

INSTITUTION: Emeritus (retired) Professor, The Australian National University; and Senior Fellow, Stockholm Resilience Centre

ROLE IN THE CURRENT ACTIVITIES OF CHH: Chair of Scientific Advisory Board

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Q1. What is the one main reason for you/ your institution to support CHH?

I am an Earth System scientist, so am very interesting in a systems perspective of the future of the Earth. That is, what trajectories of the Earth System are possible in the next few hundreds or thousands of years, what do they mean for the future of humanity, and what roles can human societies play in steering the future trajectories of the Earth System? In short, what sort of "Common Home for Humanity" do we want, and how do we manage our relationship to the rest of the Earth System to ensure we achieve a common home that we want?

Q2. What is the most attractive feature of CHH?

For the first time, we have here in CHH a concept and approach that does NOT try to downscale the Earth System, or break it up into smaller components. It recognises the Earth System AS A SINGLE WHOLE, a single complex system that provides the life support system for humanity. This is a profoundly different concept and approach to others that try to deal with global environmental issues (e.g., the UN SDGs).

Q3. What do you think is/ will be your valuable input to the establishment of CHH?

To provide scientific support in terms of our improving understanding of the dynamics of the Earth System, potential future trajectories of the system, and the role of human activities in infuencing these trajectories. Also, I'm involved in the further development of the planetary boundaries approach, which provides a guidance system for managing our relationship with the Earth System.

Q4. Do you see your role/ contribution evolve in CHH from what it is now to what it would be once CHH is an independent legal entity? If yes, could you explain this in one sentence?

No, I will continue to provide scientific support and advice.

Q5. What, according to you, would define the strength of CHH as an organisation?

The CHH could become a focal point for scholars and practitioners from all walks of life who understand the concept of the Earth System as a single, complex system and who are committed to managing humanity's relationship (i.e., that is, managing us) to maintain a stable and accommodating state of the system.

Q6. What, according to you, would define success of CHH in the short-term and in the long-term?

In the short-term, getting legal status for the Earth System. This would a huge achievement, and a turning point in humanity's relationship with its home planet. In the long term, success of the CHH would be measured by its influence on approaches to manage human activities to respect and be stewards of the Earth System and all of its life.

Q7. What do you see as the single biggest challenge faced by CHH today?

Dealing with the dominant neo-liberal economic paradigm that is destructive to life in general and is now threatening the stability of the Earth System as a whole (that is, our current economic system has already pushed the Earth System out of the Holocene and into the Anthropocene).

Q8. What are the three main areas that CHH should focus on to establish its integrity as an independent globally reputable organisation?

Be always based on a sound scientific understanding of the Earth System.

Focus its initial activities on gaining legal recognition for the Earth System, which in itself will involve a tremendous educational effort.

Become a global hub, in Porto, for reputable activities around the world that have common aims with CHH

Q9. What do you see as the one important CHH engagement and/or achievement in

2018 – major conference in Porto, introducing CHH to the world

2019 – submission of the Earth System as common, intangible natural heritage to the World Heritage Commission of UNESCO (it may not succeed but would a tremendous educational endeavour).

2020 – have a spreading base of support, both in human resources and in funding, allowing many more educational and legal activities

Q10. What, according to you, would be the challenges that are likely to face CHH in the short- term and long term?

There is one very big potential challenge – if CHH achieves much higher status and influence in international thinking, the dominant world power structures and economic players will come after it and try to discredit it. So we need to think of where risks and threats lie as the CHH concept develops.